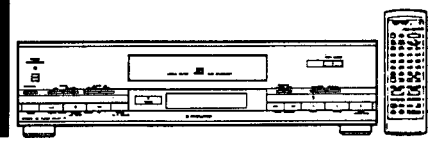
PIONEER®
The future of sound and vision.

# Service Manual



ORDER NO.
ARP1968

STEREO CD TUNER

# FD-J7

**FD-J7 HAS FOLLOWING VERSIONS :**

| Type | Power requirement | Export destination |
|---|---|---|
| KU | AC 120V only | U.S.A |
| HEI | AC 220V, 240V (switchable) * | European continent |
| HB | AC 220V, 240V (switchable) * | United kingdom |

* Change the position of the jumper wire of the PWTB unit.

- **This manual is applicable to the KU, HEI and HB types.**
- **As to the HEI and HB types, refer to page 102.**
- **The FD-J7/HEI and HB covers MW/LW bands while the FD-J7/KU covers MW only.**
- **Ce manuel pour le service comprend les explications de réglage en français.**
- **Este manual de servicio trata del método ajuste escrito en español.**

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**PIONEER ELECTRONIC CORPORATION** 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
**PIONEER ELECTRONICS SERVICE INC.** P.O. Box 1760, Long Beach, California 90801 U.S.A.
**PIONEER ELECTRONICS OF CANADA, INC.** 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
**PIONEER ELECTRONIC [EUROPE] N.V.** Keetberglaan 1, 2740 Beveren, Belgium
**PIONEER ELECTRONICS AUSTRALIA PTY. LTD.** 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911


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IFI MAR. 1990 Printed in Japan

**This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.**
**Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.**

WARNING
**Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).**
**When servicing or handling circuit boards and other components which contain lead in in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.**

# 1. SAFETY INFORMATION

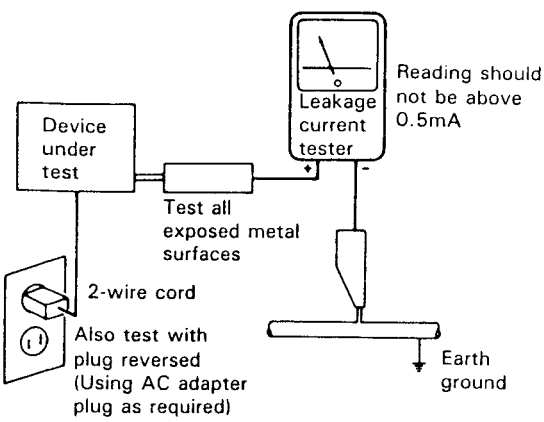
(FOR USA MODEL ONLY)

## 1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

### LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Reading should not be above 0.5mA
Leakage current tester
Device under test
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

**ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.**

## 2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

## (FOR EUROPEAN MODEL ONLY)

VARO!
AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.

ADVERSEL:
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSAETTELSE FOR STRÅLING.

VARNING!
OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.

LASER
Kuva 1
Lasersateilyn varoitusmerkki

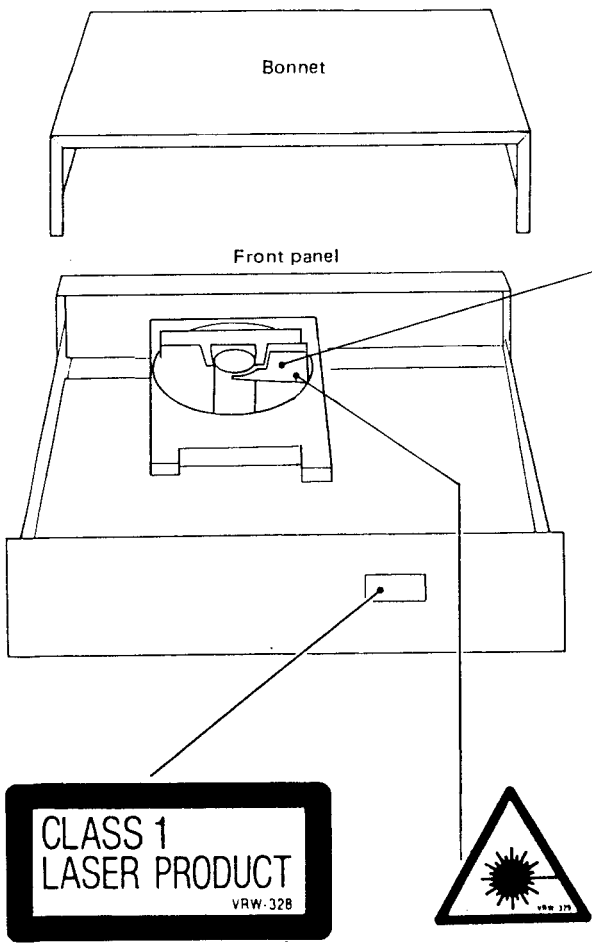
WARNING!
DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.

IMPORTANT
THIS PIONEER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

LASER DIODE CHARACTERISTICS
MAXIMUM OUTPUT POWER: 5 mw
WAVELENGTH: 780-785 nm

LASER
Picture 1
Warning sign for laser radiation

## LABEL CHECK




HEI and HB models

### HB model

CAUTION
INVISIBLE LASER RADIATION WHEN OPEN, AVOID EXPOSURE TO BEAM PRW1018

### HEI model

ADVARSEL
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHED SAFBRYDERE ER UDE AF FUNKTION.
UNDGÅ UDSÆTTELSE FOR STRÅLING.
VORSICHT!
UNSICHTBARE LASER-STRAHLUNG TRITT AUS, WENN DECKEL (ODER KLAPPE) GEÖFFNET IST! NICHT DEM STRAHL AUSSETZEN!
VRW1094

### Additional Laser Caution

1. Laser Interlock Mechanism
   The ON/OFF status of the clamp switch (S102) for detecting loading completion is detected by the system microprocessor, and the design prevents laser diode oscillation when the clamp switch is OFF.
   Thus, the interlock will no longer function if the clamp switch (S102) is deliverately shorted.
   In the test mode the interlock mechanism will not function (refer to page 38).
   Laser diode oscillation will continue if pin 4, 5, or 29 of CXA1081S (ICI) is connected to ground or the terminals of Q1 are shorted to each other (fault condition).
2. If the fault condition described in 1 is induced with the cover removed and the objective lens extending past the outer circumference of the disc clamper diameter, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 or higher laser beam.

# 2. EXPLODED VIEWS AND PARTS LIST

NOTES :
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

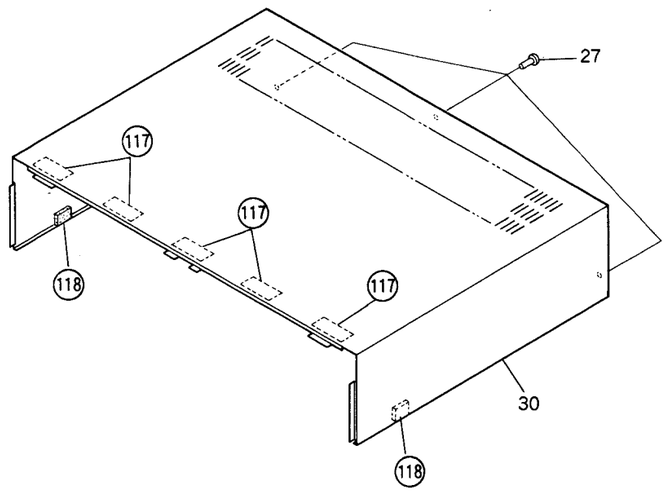
## 2.1 Exterior

### Parts List

| Mark | No. | Part No. | Description |
|---|---|---|---|
| ◉ | 1 | RWE1011 | TUNR unit |
| | 2 | RXA1282 | LCD unit |
| | 3 | LC7582 | IC |
| | 4 | REL1002 | Lamp |
| ⚠ | 5 | CM-22C | Strain relief |
| ⚠ | 6 | PDG1002 | AC power cord |
| ⚠ | 7 | REK-079 | Fuse (FU401,FU402, 800mA) |
| ⚠ | 8 | REK-080 | Fuse (FU403,FU404, 1A) |
| ⚠ | 9 | AKP-507 | 1P AC outlet |
| ⚠ | 10 | RTT1118 | Power transformer |
| | 11 | RNT1068 | Panel stay |
| | 12 | RAC1393 | O/C knob |
| | 13 | RAC1394 | Control button L |
| | 14 | RAC1395 | Control button R |
| | 15 | RAC1396 | Button A |
| | 16 | RAC1397 | Button B |
| | 17 | RAC1398 | Power button |
| | 18 | RAH1673 | Display cover |
| | 19 | RAH1576 | Tray name plate |
| | 20 | RAH1531 | Remote sensor window |
| | 21 | RAH1565 | Front panel UP |
| | 22 | RAH1566 | Front panel LW |
| | 23 | RNK1481 | Name plate holder |
| | 24 | ABZ30P080FMC | Screw |
| | 25 | BBT30P100FZK | Screw |
| | 26 | BBZ30P080FMC | Screw |
| | 27 | BBZ30P080FZK | Screw |
| | 28 | BBZ20P040FMC | Screw |
| | 29 | IBZ30P150FMC | Screw |
| | 30 | RXX1247 | Bonnet |
| | 31 | RWZ1894 | MAIN unit |
| | 32 | RWZ1897 | KEYL unit |
| | 33 | RWZ1898 | KEYR unit |
| | 34 | RWZ1896 | PWSB unit |
| | 35 | RWZ1895 | PWTB unit |
| | 36 | PDZ30P050FMC | Screw |
| | 37 | BCZ30P060FCU | Screw |
| | 38 | AMR1939 | Insulator assembly |
| | 101 | | Shield plate assembly |
| | 102 | | Earth plate |
| | 103 | | • • • • • |
| | 104 | | • • • • • |
| | 105 | | • • • • • |
| | 106 | | Angle |
| | 107 | | P. C. B Spacer |
| | 108 | | • • • • • |
| | 109 | | Rear panel |
| | 110 | | Indicator lens |
| | 111 | | Mechanism section |
| | 112 | | Earth plate |
| | 113 | | P. C. board bracket A |
| | 114 | | P. C. board bracket B |
| | 115 | | Main chassis |
| | 116 | | Cord holder |
| | 117 | | Cushion |
| | 118 | | Rubber spacer |
| | 119 | | Rubber bushing |

**• How to replace the LCD unit and lamp**

1. Remove the bonnet.
2. Remove the front panel.
3. Remove the lamp by turn to the left at the back (from the foil side) of LCD unit.
4. Remove the LCD unit.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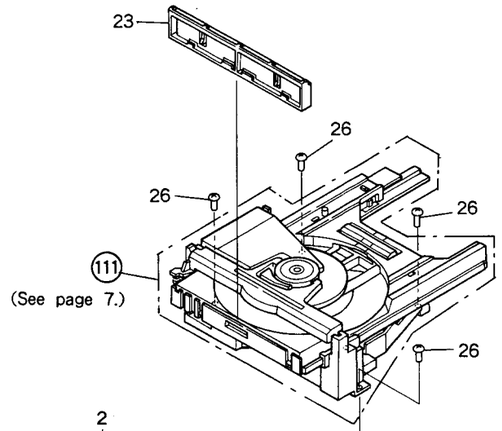
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(See page 7.)
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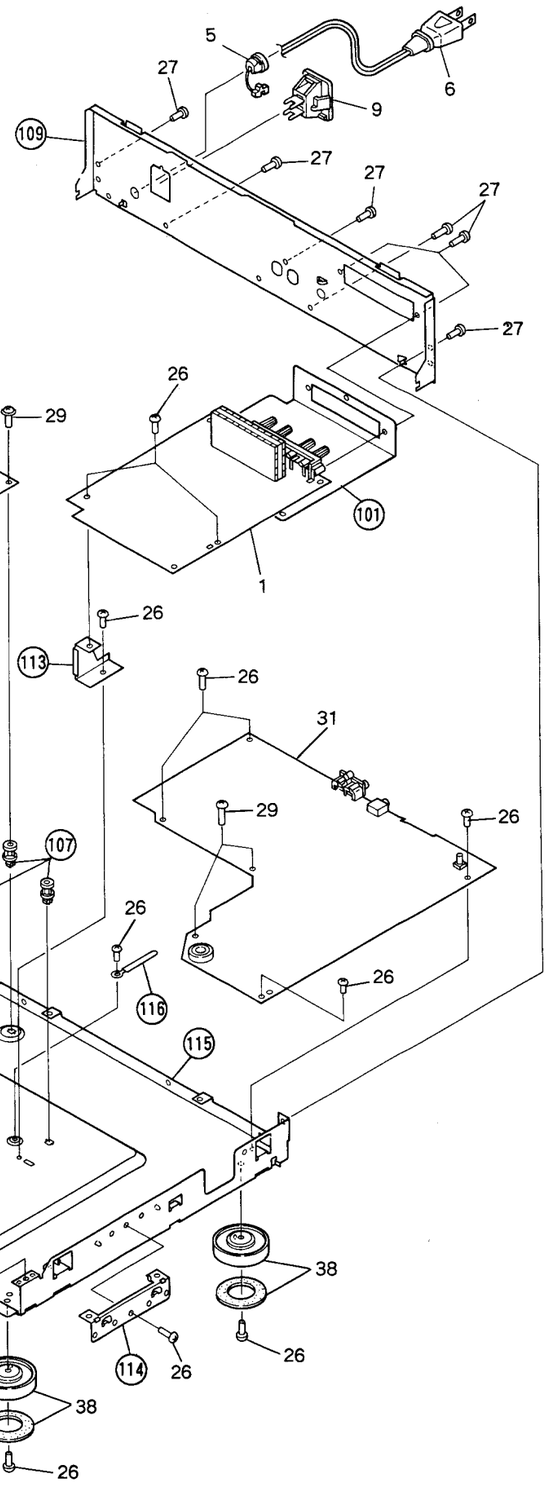
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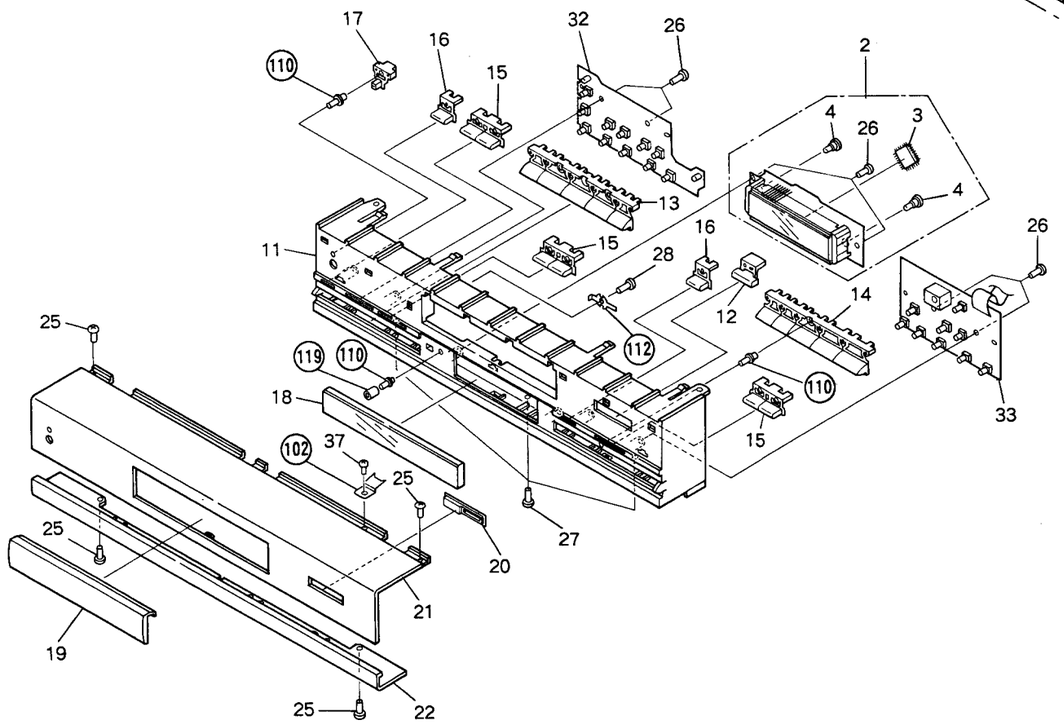
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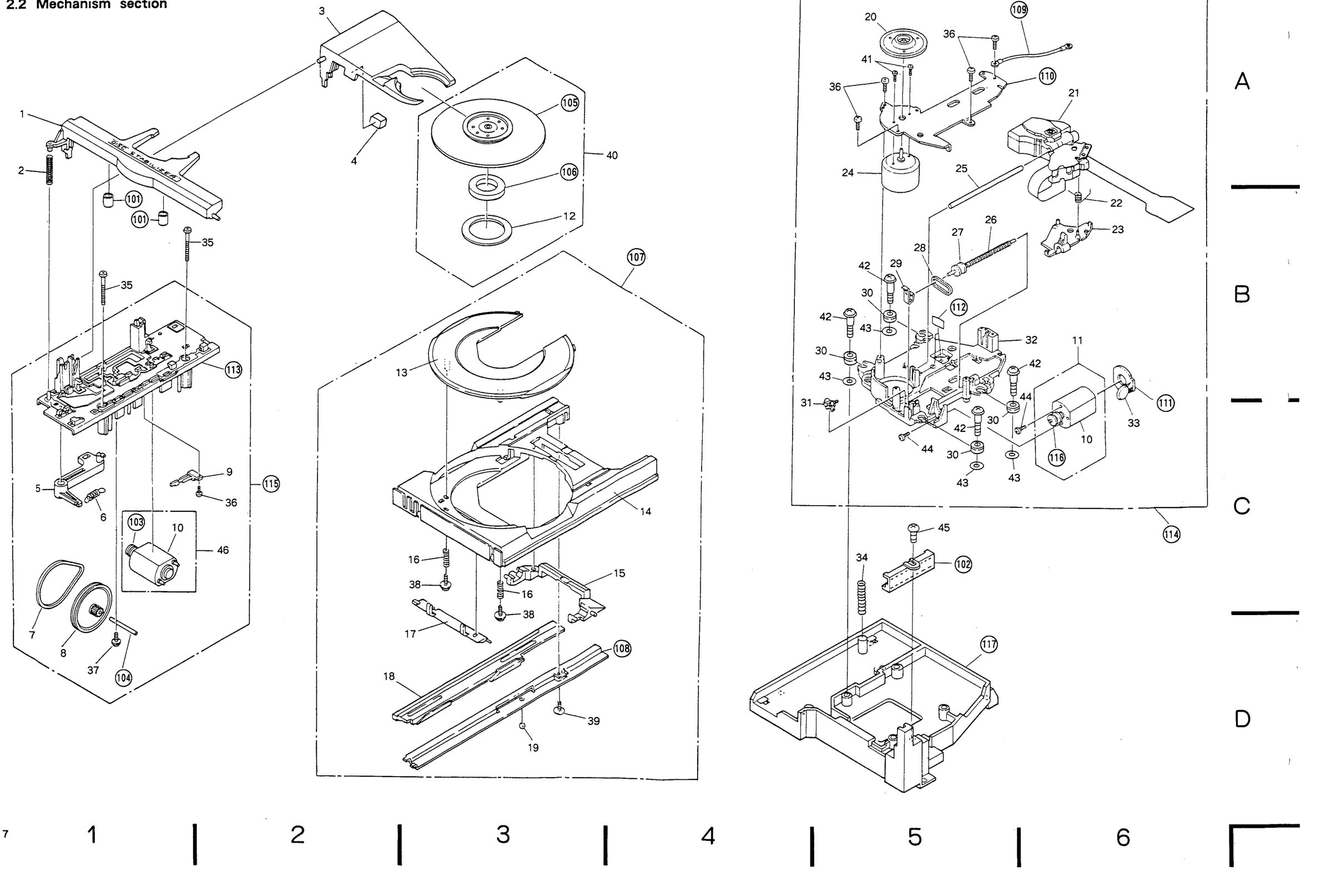
## 2.2 Mechanism section



## Parts List

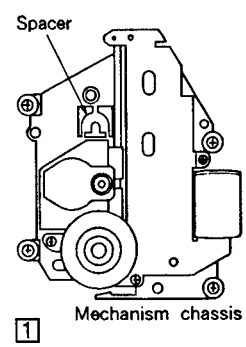
| Mark | No. | Part No. | Description |
|---|---|---|---|
| | 1 | PNW1085 | Clamp retainer |
| | 2 | PBH1013 | Spring |
| | 3 | PNW1084 | Clamp holder |
| | 4 | PEB1032 | Stopper rubber |
| | 5 | PNW1083 | Clamp lever |
| | 6 | PBH1012 | Clamp spring |
| | 7 | PEB1013 | Belt |
| | 8 | PNW1171 | Gear pulley |
| | 9 | VSK-015 | Leaf switch (CLAMP, S102) |
| | 10 | PXM1002 | Motor |
| | 11 | PYY1025 | Motor assembly (CARRIAGE) |
| | 12 | PNM1010 | Disc cushion |
| | 13 | RNK1504 | Disc plate |
| | 14 | RNK1503 | Tray |
| | 15 | PNW1331 | Plate lever (R) |
| | 16 | PBH1045 | Plate spring |
| | 17 | PNW1330 | Plate lever (F) |
| | 18 | PNW1332 | Rack |
| | 19 | PBP-001 | Steel ball $\phi 4$ |
| | 20 | PNW1064 | Disc table |
| | 21 | PWY1010 | Pickup assembly |
| | 22 | PBH1008 | Drive spring |
| | 23 | PNW1578 | Carriage plate |
| | 24 | PYY1109 | Motor assembly (with oil, SPINDLE) |
| | 25 | PLA1004 | Guide bar |
| | 26 | PLA1003 | Drive worm |
| | 27 | PNW1066 | Pulley |
| | 28 | PEB1072 | Belt |
| | 29 | PBK1057 | Plate spring |
| | 30 | PEB1014 | Floating rubber |
| | 31 | PSH1003 | Slide switch (INSIDE, S101) |
| | 32 | PNW1520 | Mechanism chassis |
| | 33 | CGDYX104M25 | Semiconductive ceramic capacitor |
| | 34 | RBH1221 | Earth spring |
| | 35 | BPZ30P250FMC | Screw |
| | 36 | BPZ20P080FZK | Screw |
| | 37 | IPZ30P060FMC | Screw |
| | 38 | PBA1025 | Screw |
| | 39 | PPZ30P080FMC | Screw |
| | 40 | PYY1084 | Clamper assembly |
| | 41 | PBA1037 | Screw M2 × 2.5 |
| | 42 | PBA1016 | Floating screw |
| | 43 | WB30FMC | Washer |
| | 44 | PMZ20P030FMC | Screw |
| | 45 | ABZ30P080FMC | Screw |
| | 46 | PYY1090 | Motor assembly (LOADING) |

| Mark | No. | Part No. | Description |
|---|---|---|---|
| | 101 | | Clamp retainer rubber |
| | 102 | | Tray guide |
| | 103 | | Motor pulley |
| | 104 | | Gear shaft |
| | 105 | | Clamper |
| | 106 | | Magnet |
| | 107 | | Tray assembly |
| | 108 | | Slide base |
| | 109 | | Earth lead unit |
| | 110 | | Base plate |
| | 111 | | Carriage M board |
| | 112 | | Cloth tape |
| | 113 | | Loading base |
| | 114 | | Servo mechanism assembly |
| | 115 | | Loading base assembly |
| | 116 | | Motor pulley |
| | 117 | | Mechanism base |

### • How to install the disc tabel

1 Remove the spacer from the mechanism chassis by use nippers or other tool to cut it.

2 When putting the disc table, certainly put spacer at the bottom of spindle motor, and stick the disc table on the top (takes about 9kg pressure). Take off the spacer.

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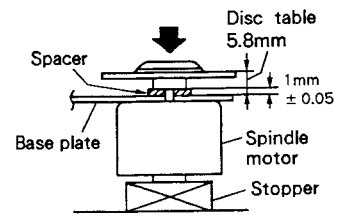


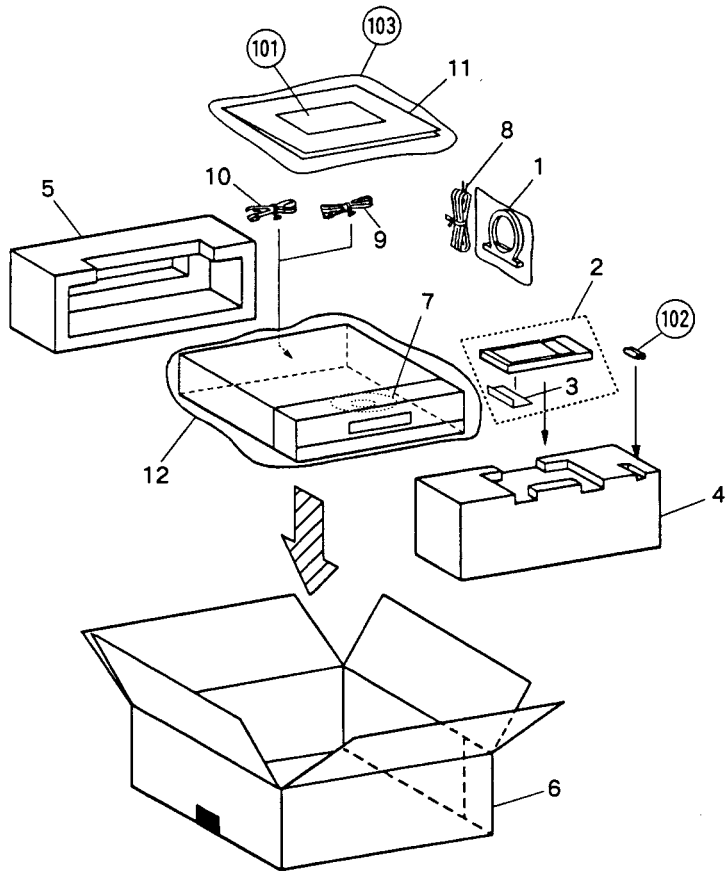

2

# 3. PACKING

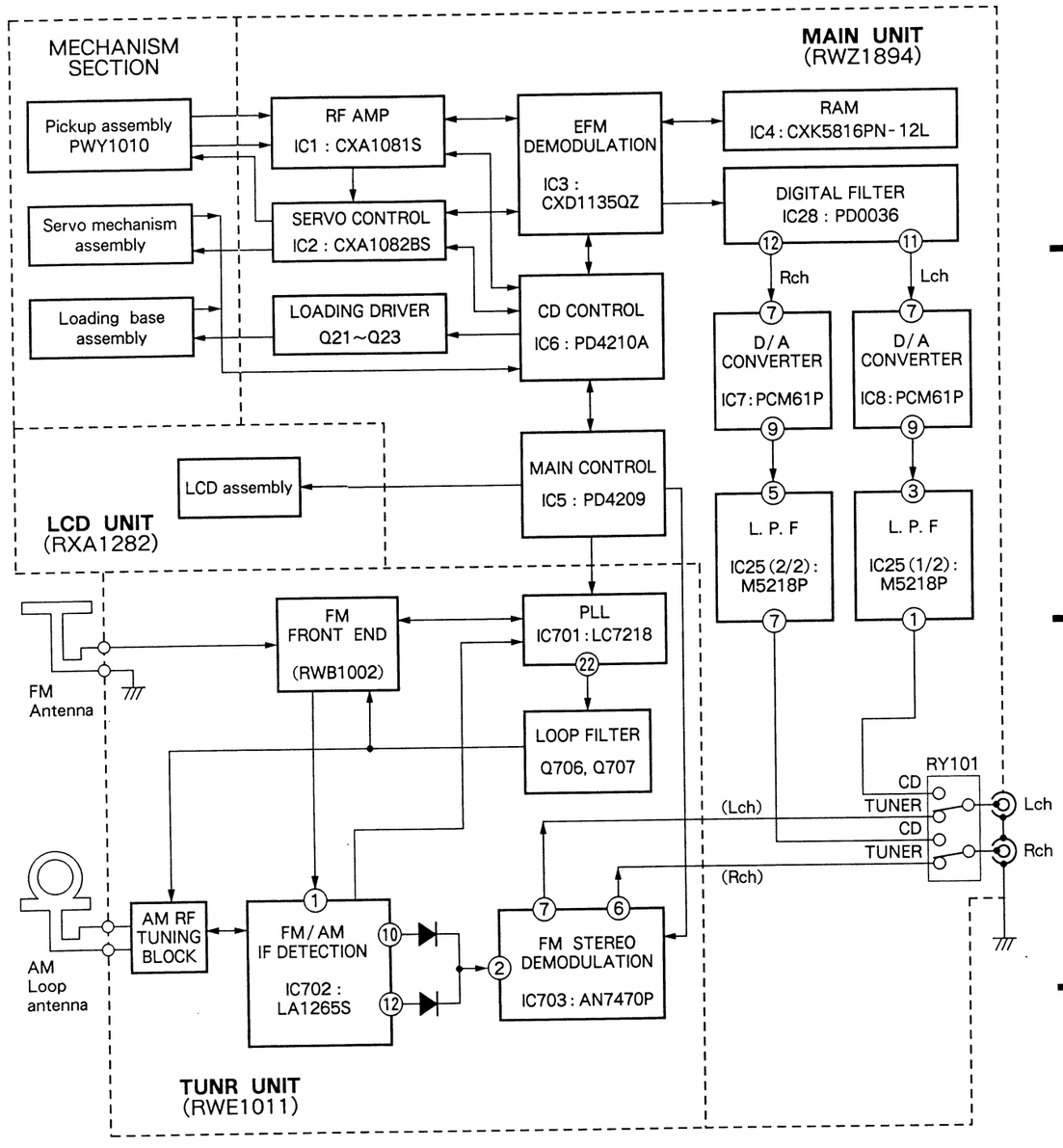
## Parts List

| Mark | No. | Part No. | Description |
|---|---|---|---|
| | 1 | ATB-113 | Loop antenna assembly |
| | 2 | RPX1038 | Wireless remote control |
| | 3 | RNK1507 | Battery cover |
| | 4 | RHA1048 | Pad F |
| | 5 | RHA1049 | Pad R |
| | 6 | RHG1162 | Packing case |
| | 7 | PHC1030 | Spacer |
| | 8 | ADH1005 | FM antenna |
| | 9 | RDE1023 | Control cord S |
| | 10 | RDE1025 | Connection cord |
| | 11 | RRB1067 | Operating instructions (English) |
| | 12 | RHX-034 | Sheet |

| Mark | No. | Part No. | Description |
|---|---|---|---|
| | 101 | | Warranty card |
| | 102 | | Battery (UM-4) |
| | 103 | | Polyethylene bag |

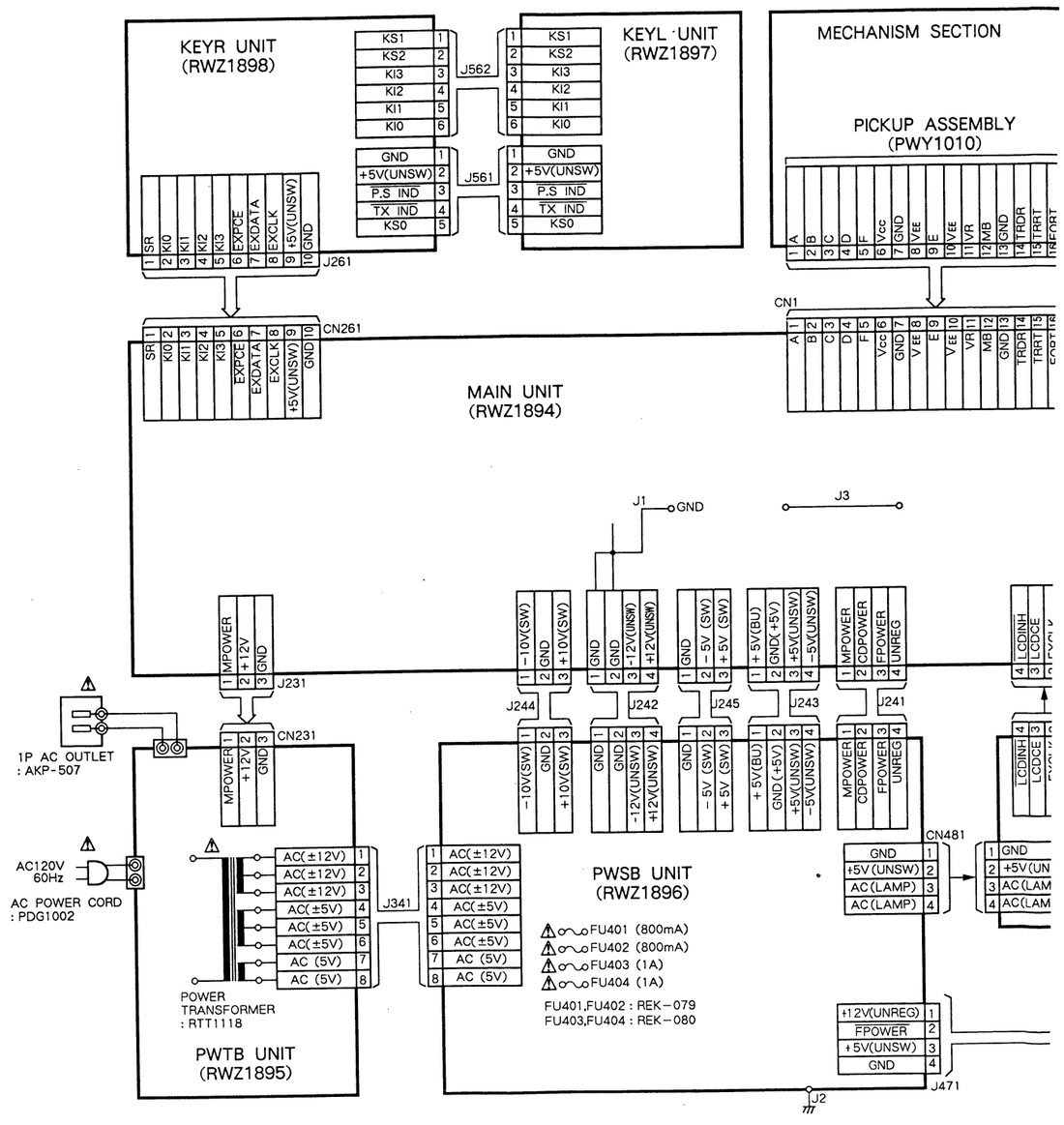


# 4. BLOCK DIAGRAM



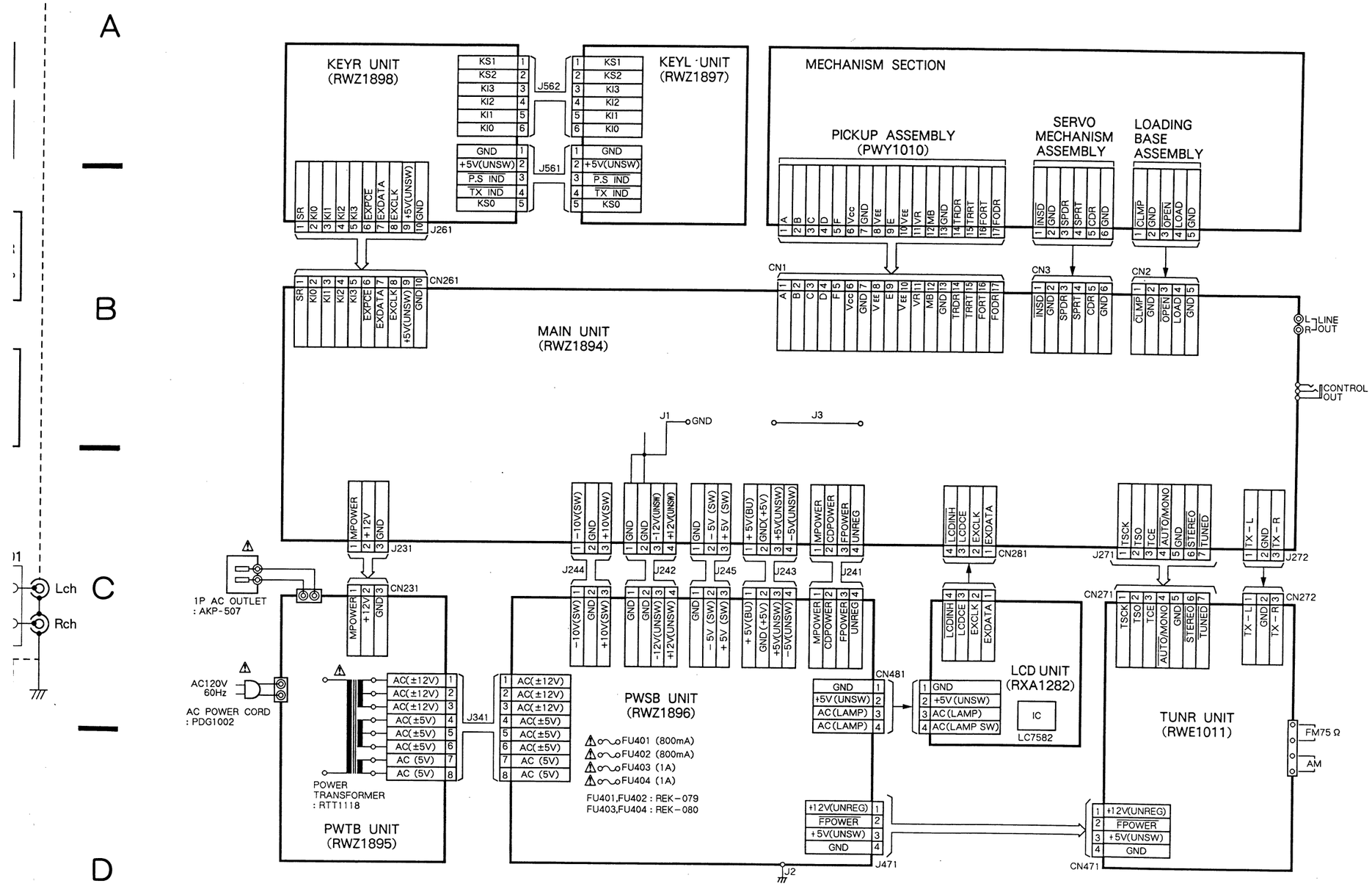

# 5. SCHEMATIC DIAGRAMS

## 5.1 OVERALL WIRING DIAGRAM



# 5. SCHEMATIC DIAGRAMS

## 5.1 OVERALL WIRING DIAGRAM



## 5.2 TUNR, LCD, KEYL AND KEYR UNITS

1. RESISTORS :
Indicated in Ω, 1/4W, 1/6W and 1/8W, ± 5 % tolerance unless otherwise noted k ; kΩ, M ; MΩ, (F) ; ± 1 %, (G) ; ± 2 %, (K) ; ± 10 %, (M) ; ± 20 % tolerance.

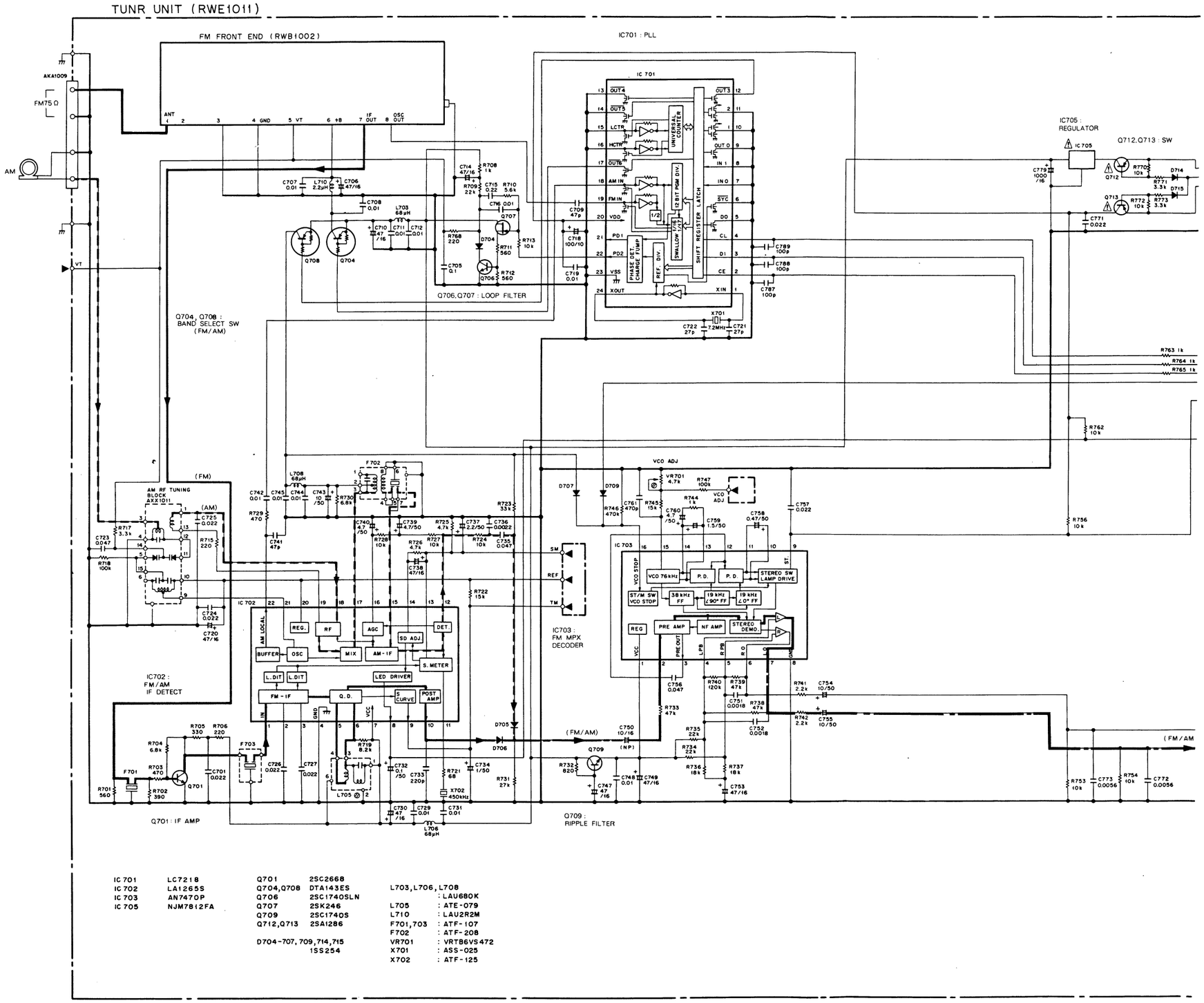
2. CAPACITORS :
Indicated in capacity ( μF) / voltage (V) unless otherwise noted p ; pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT :
▭ ; DC voltage (V) at no input signal, and refer to the tables of the voltage (pages 17 and 18).

4. OTHERS :
➡ ; Signal route.
⊘ ; Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

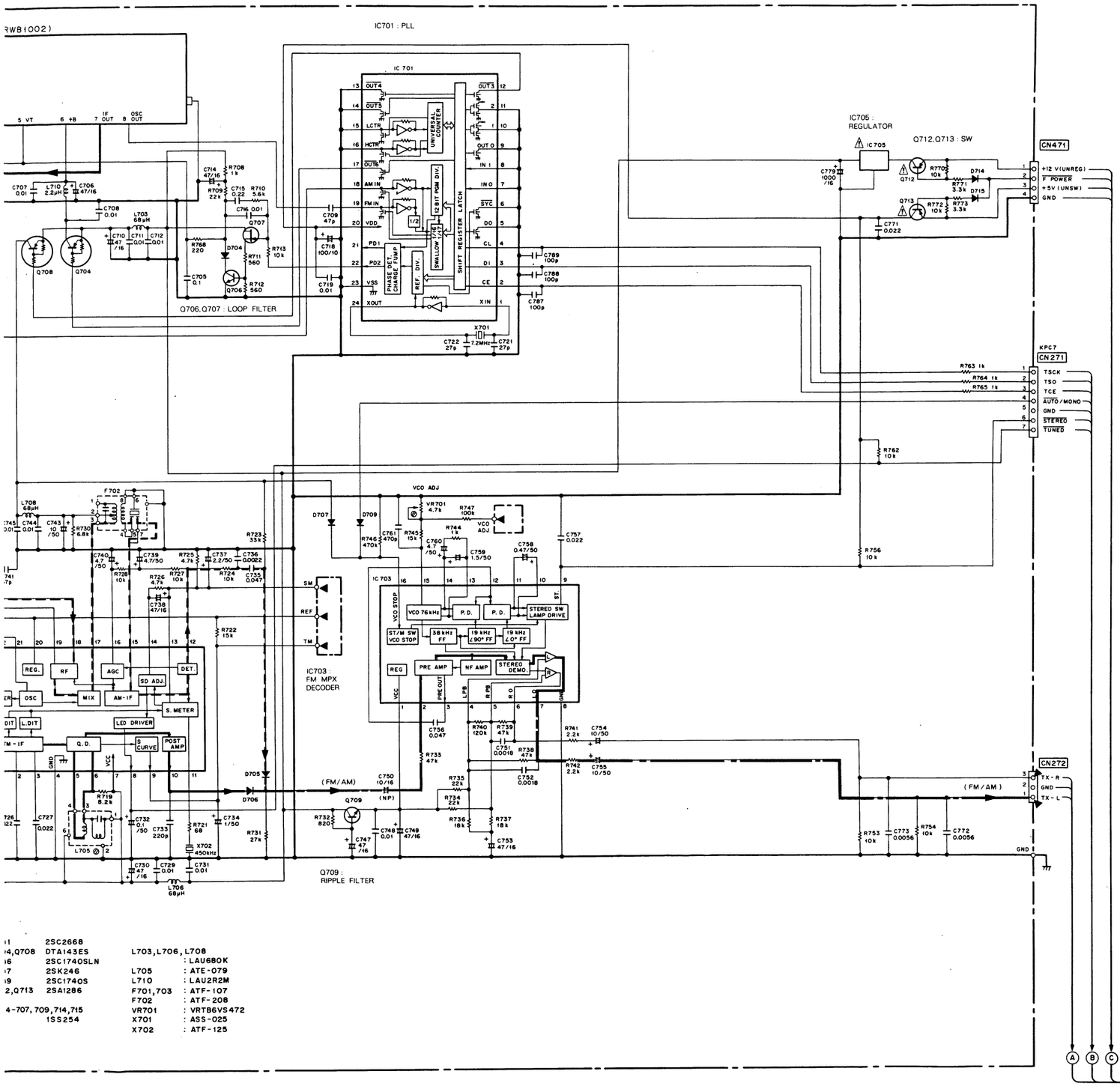
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

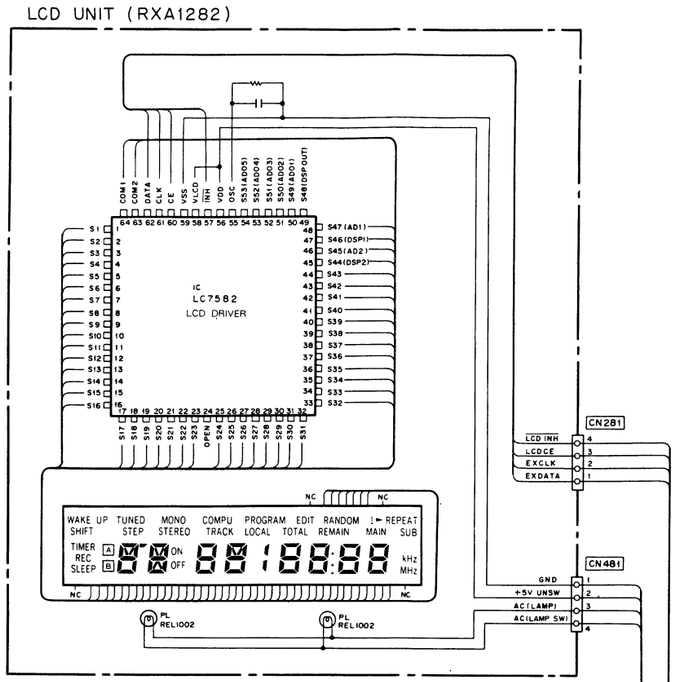
5. SWITCHES : (The underlined indicates the switch position)
OUTSIDE OF P. C. BOARDS UNIT
S101 : INSIDE ON — OFF
S102 : CLAMP CLAMP — OPEN
Main UNIT
S1 : TEST MODE ON — OFF
KEYL UNIT
S501 : POWER STANDBY/ON
S502 : BAND CD ▷ TUNER
S503 : TIMER ON/OFF
S504 : SET/NEXT TUNING
S505 : MODE
S506 : WAKE UP ON/OFF
S507 : SET/NEXT UP
S508 : MEMORY
S509 : WAKE UP SHIFT
S510 : SET/NEXT DOWN
S511 : TIMER SET
KEYR UNIT
S601 : STOP TUNER ▷ CD
S602 : TRACK SEARCH ⏮
S603 : DISPLAY/CLOCK ADJ
S604 : TRACK SEARCH ⏭
S605 : OPEN/CLOSE
S606 : PLAY
S607 : RANDOM
S608 : PAUSE
S609 : REPEAT

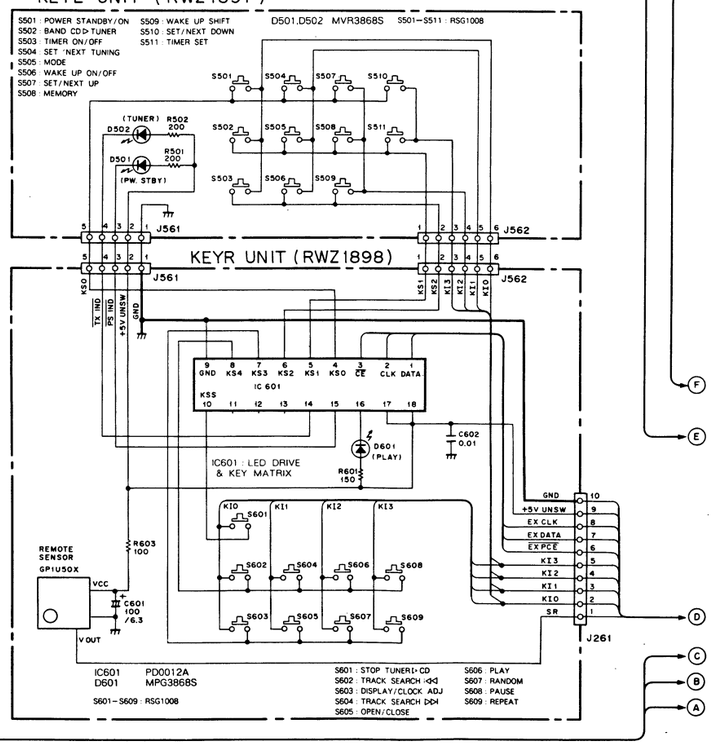



| | | | | | |
|---|---|---|---|---|---|
| IC 701 | LC7218 | Q701 | 2SC2668 | L703,L706,L708 | : LAU680K |
| IC 702 | LA1265S | Q704,Q708 | DTA143ES | L705 | : ATE-079 |
| IC 703 | AN7470P | Q706 | 2SC1740SLN | L710 | : LAU2R2M |
| IC 705 | NJM7812FA | Q707 | 2SK246 | F701,703 | : ATF-107 |
| | | Q709 | 2SC1740S | F702 | : ATF-208 |
| | | Q712,Q713 | 2SA1286 | VR701 | : VRTB6VS472 |
| | | D704-707,709,714,715 | 1SS254 | X701 | : ASS-025 |
| | | | | X702 | : ATF-125 |

▶ : Measuring point
——— : FM signal route
- - - - : AM signal route
— — — : FM/AM signal route


IC701 : PLL
IC 701
UNIVERSAL COUNTER
12 BIT PGM DIV
SHIFT REGISTER LATCH
SWALLOW 1/2
REF. DIV
PHASE DET. CHARGE PUMP
Q706,Q707 : LOOP FILTER
X701
7.2MHz
IC705 : REGULATOR
Q712,Q713 : SW
+12 V(UNREG)
F POWER
+5V (UNSW)
GND
CN471
KPC7
CN271
TSCK
TSO
TCE
AUTO/MONO
STEREO
TUNED
VCO ADJ
IC703 : FM MPX DECODER
VCO 76kHz
P.D.
STEREO SW LAMP DRIVE
38kHz FF
19kHz 90° FF
19kHz 0° FF
PRE AMP
NF AMP
STEREO DEMO.
REG.
RF
AGC
SD ADJ
DET.
MIX
AM-IF
OSC
S. METER
LED DRIVER
Q.D.
S CURVE
POST AMP
(FM/AM)
(NP)
Q709 : RIPPLE FILTER
CN272
TX-R
TX-L
GND
2SC2668
DTA143ES
2SC1740SLN
2SK246
2SC1740S
2SA1286
1SS254
L703,L706,L708 : LAU680K
L705 : ATE-079
L710 : LAU2R2M
F701,703 : ATF-107
F702 : ATF-208
VR701 : VRTB6VS472
X701 : ASS-025
X702 : ATF-125


LCD UNIT (RXA1282)
IC
LC7582
LCD DRIVER
WAKE UP SHIFT
TUNED STEP
MONO STEREO
COMPU TRACK
PROGRAM EDIT LOCAL TOTAL
RANDOM REMAIN
REPEAT MAIN SUB
TIMER REC SLEEP
ON OFF
kHz MHz
PL REL1002
CN281
LCD INH
LCDCE
EXCLK
EXDATA
CN481
GND
+5V UNSW
AC(LAMP)
AC(LAMP SW)


KEYL UNIT (RWZ1897)
S501 : POWER STANDBY/ON
S502 : BAND CD▷ TUNER
S503 : TIMER ON/OFF
S504 : SET ↑NEXT TUNING
S505 : MODE
S506 : WAKE UP ON/OFF
S507 : SET/NEXT UP
S508 : MEMORY
S509 : WAKE UP SHIFT
S510 : SET/NEXT DOWN
S511 : TIMER SET
D501,D502 MVR3868S
S501–S511 : RSG1008
(TUNER)
(PW. STBY)
J561
J562
KEYR UNIT (RWZ1898)
IC 601
IC601 : LED DRIVE & KEY MATRIX
D601 (PLAY)
REMOTE SENSOR GP1U50X
J261
IC601 PD0012A
D601 MPG3868S
S601–S609 : RSG1008
S601 : STOP TUNER/▷CD
S602 : TRACK SEARCH ↑◁◁
S603 : DISPLAY/CLOCK ADJ
S604 : TRACK SEARCH ▷▷↓
S605 : OPEN/CLOSE
S606 : PLAY
S607 : RANDOM
S608 : PAUSE
S609 : REPEAT

## Voltages of the Tuner section

IC701
(LC7218) (Unit : V)

| Pin No. | FUNCTION SELECT | | |
|---|---|---|---|
| | CD | TUNER | |
| | | AM | FM |
| 1 | 0 | 2.2 | 2.2 |
| 2 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 |
| 12 | 0 | 0.2 | 11.9 |
| 17 | 0 | 12 | 0.2 |
| 18 | 0 | 2.3 | 0 |
| 19 | 0 | 0 | 2.3 |
| 20 | 0 | 4.9 | 4.9 |
| 22 | 0 | 0.5 | 0.5 |
| 24 | 0 | 2.2 | 2.2 |

IC702
(LA1265S) (Unit : V)

| | Pin No. | FUNCTION SELECT | | |
|---|---|---|---|---|
| | | CD | TUNER | |
| | | | AM | FM |
| | 1 | 0 | 1.1 | 2.2 |
| | 2 | 0 | 1.1 | 2.2 |
| | 3 | 0 | 1.1 | 2.2 |
| | 5 | 0 | 11.9 | 11.9 |
| | 6 | 0 | 11.9 | 11.9 |
| | 7 | 0 | 11.9 | 11.9 |
| *1) | 8 | 0 | 0V at tuned<br>4.4V at not tuned | |
| | 9 | 0 | 3.4 | 3.8 |
| | 10 | 0 | 2.9 | 2.7 |
| | 11 | 0 | 1.4 | 1.4 |
| | 12 | 0 | 1.7 | 1.4 |
| *2) | 13 | 0 | All 0V at not tuned | |
| *2) | 14 | 0 | | |
| | 15 | 0 | 1.1 | 2.2 |
| | 16 | 0 | 1.7 | 1.7 |
| | 17 | 0 | 11.9 | 0 |
| | 18 | 0 | 2 | 0 |
| | 19 | 0 | 2 | 0 |
| | 20 | 0 | 3.6 | 3.8 |
| | 21 | 0 | 3.6 | 3.8 |
| | 22 | 0 | 1.5 | 2.6 |

IC703
(AN7470P) (Unit : V)

| Pin No. | FUNCTION SELECT | | |
|---|---|---|---|
| | CD | TUNER | |
| | | AM | FM |
| 1 | 0 | 11.3 | 11.3 |
| 2 | 0 | 2.5 | 2.5 |
| 3 | 0 | 6 | 6 |
| 4 | 0 | 9 | 9 |
| 5 | 0 | 9 | 9 |
| 6 | 0 | 4.3 | 4.3 |
| 7 | 0 | 4.3 | 4.3 |
| 9 | 0 | 5 | *3 |
| 10 | 0 | 2.5 | 2.5 |
| 11 | 0 | 2.5 | 2.5 |
| 12 | 0 | 2.5 | 2.5 |
| 13 | 0 | 2.5 | 2.5 |
| 14 | 0 | 2.5 | 2.5 |
| 15 | 0 | 0.3 | 3.2 |
| 16 | 0 | 11.4 | *4 |

FM front end
(RWB1002) (Unit : V)

| | Pin No. | FUNCTION SELECT | | |
|---|---|---|---|---|
| | | CD | TUNER | |
| | | | AM | FM |
| | 1 | 0 | 0 | 0.1 |
| | 5 | 0 | 1.4 – 8.3 | 1.5 – 7.9 |
| *5) | 6 | 0 | 0 | 11.8 |
| | 7 | 0 | 0 | 0 |
| | 8 | 0 | 0 | 0 |

(Unit : V)

| | Measuring point | | FUNCTION SELECT | | |
|---|---|---|---|---|---|
| | | | CD | TUNER | |
| | | | | AM | FM |
| | IC705 | IN | 17.1 | 16 | 16 |
| | | OUT | 0 | 12 | 12 |
| | Q704 | Emitter | 0 | 11.9 | 11.9 |
| | | Collector | 0 | 0 | 11.8 |
| | | Base | 0 | 12 | 0.2 |
| *5) | Q706 | Collector | 12 | 0.9 – 7.8 | 1 – 7.4 |
| | | Base | 0 | 0.6 | 0.6 |
| | Q707 | Drain | 0 | 11.8 | 11.8 |
| | | Source | 0 | 1.2 | 1.2 |
| | | Gate | 0 | 0.6 | 0.6 |
| | Q708 | Emitter | 0 | 11.9 | 11.9 |
| | | Collector | 0 | 11.9 | 0 |
| | | Base | 0 | 0.2 | 11.9 |
| | Q709 | Emitter | 0 | 11.3 | 11.3 |
| | | Collector | 0 | 12 | 12 |
| | | Base | 0 | 12 | 12 |
| | Q712 | Emitter | 17 | 16.5 | 16.3 |
| | | Collector | 17.1 | 16 | 16 |
| | | Base | 16.9 | 15.8 | 15.6 |
| | Q713 | Emitter | 5 | 4.9 | 4.9 |
| | | Collector | 0 | 4.9 | 4.9 |
| | | Base | 5 | 4.2 | 4.2 |
| | D705 | Cathode | 0 | 5.2 | 2.2 |
| | D709 | Anode | 0 | 0 | 2.4 |
| | D714 | Cathode | 16.3 | 0 | 0 |

*1) Tuning indicator output, "L" = 0V at the light up and "H" = 4.4V at the light goes down.

*2) The value cannot be indicated simply in voltage as it is a level which corresponds to the signal meter sensitivity. The value will be 0V when no signal is tuned.

*3) FM stereo indicator output, 0.6V at STEREO and 4.3V at MONO.

*4) FM MPX VCO stop, 2V at FM forced MONO and 0V at others.

*5) Voltage changes by the BAND reception frequency because of this is the tuning voltage.

## Voltages of the CD section

(Unit : V)

| Measuring point | | FUNCTION SELECT | | | | |
|---|---|---|---|---|---|---|
| | | CD | | | TUNER | |
| | | STOP | PLAY | LOADING | FM | AM |
| IC401 | IN | 16.2 | 16.1 | 16.2 | 15.6 | 15.7 |
| | OUT | 12 | 12 | 12 | 12 | 12 |
| IC402 | IN | − 16.8 | − 16.8 | − 16.8 | − 16.9 | − 16.9 |
| | OUT | − 12 | − 12 | − 12 | − 12 | − 12 |
| IC403 | IN | 9.2 | 8.8 | OUT 9.2 IN 8.8 | 9.2 | 9.2 |
| | OUT | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 |
| IC404 | IN | − 9.3 | − 9.1 | OUT − 9 IN − 9.3 | − 9.9 | − 9.9 |
| | OUT | − 5 | − 5 | − 5 | − 5 | − 5 |
| IC405 | OUT | 5 | 5 | 5 | 0 | 0 |
| IC406 | OUT | − 5 | − 5 | − 5 | 0 | 0 |
| Q401 | Collector | 9 | 8.7 | OUT 9 IN 8.8 | 0.3 | 0.3 |
| | Base | 8.5 | 8.1 | OUT 8.5 IN 8.3 | 9.4 | 9.4 |
| Q402 | Emitter | 5 | 5 | OUT 5 IN 4.9 | 5 | 5 |
| | Collector | 5 | 5 | 5 | − 9.9 | − 9.9 |
| | Base | 4.3 | 4.3 | OUT 4.3 IN 4.2 | 5 | 5 |
| Q403 | Collector | − 9.3 | − 9 | OUT − 8.8 IN − 9.2 | − 0.7 | − 0.7 |
| | Base | − 9.3 | − 9 | OUT − 8.8 IN − 9.2 | − 9.9 | − 9.9 |
| Q404 | Collector | 0.03 | 0.03 | 0.03 | 9 | 9 |
| | Base | 5 | 5 | 5 | 0 | 0 |
| Q405 | Collector | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| | Base | 5 | 5 | 5 | 5 | 5 |
| Q406 | Collector | 15.5 | 15.4 | 15.4 | 0.04 | 0.04 |
| | Base | 0 | 0 | 0 | 5 | 5 |
| Q106 | Emitter | 4.5 | 4.5 | OUT 4.5 IN 4.4 | 4.4 | 4.4 |
| | Collector | − 4.9 | − 4.9 (4V at Mute) | − 4.9 | − 4.9 (4V at Mute) | − 4.9 (4V at Mute) |
| | Base | 5 | 5 (3.5V at Mute) | 5 | 5 (3.5V at Mute) | 5 (3.5V at Mute) |
| Q108 | Collector | 0.08 | 0.08 | 0.08 | 12 | 12 |
| | Base | 5 | 5 | 5 | 0 | 0 |
| Q1 | Emitter | 5 | 3.9 | 5 | 0.09 | 0.09 |
| | Collector | 0.07 | 1.9 | 0.07 | − 0.08 | − 0.08 |
| | Base | 4.7 | 3.2 | 4.3 | 0.08 | 0.08 |

• Voltages of Q104 and Q107 are refered to page 25 .

IC1
(CXA1081S) (Unit : V)

| Pin No. | Voltage | Pin No. | Voltage |
|---|---|---|---|
| 1 | 0 | 16 | − 3 |
| 2 | 1.3 | 17 | − 5 |
| 3 | 0 | 18 | 0 |
| 4 | NC | 19 | 0 |
| 5 | 2.8 | 20 | 0 |
| 6 | − 4.8 | 21 | − 4.9 |
| 7 | 0 | 22 | 0 |
| 8 | 0 | 23 | − 1 |
| 9 | 0 | 24 | − 2.1 |
| 10 | 0 | 25 | 0 |
| 11 | 0 | 26 | 2.5 |
| 12 | − 1.2 | 27 | 2.4 |
| 13 | − 0.1 | 28 | 5 |
| 14 | NC | 29 | 0 |
| 15 | − 3.1 | 30 | 5 |

IC2
(CXA1082BS) (Unit : V)

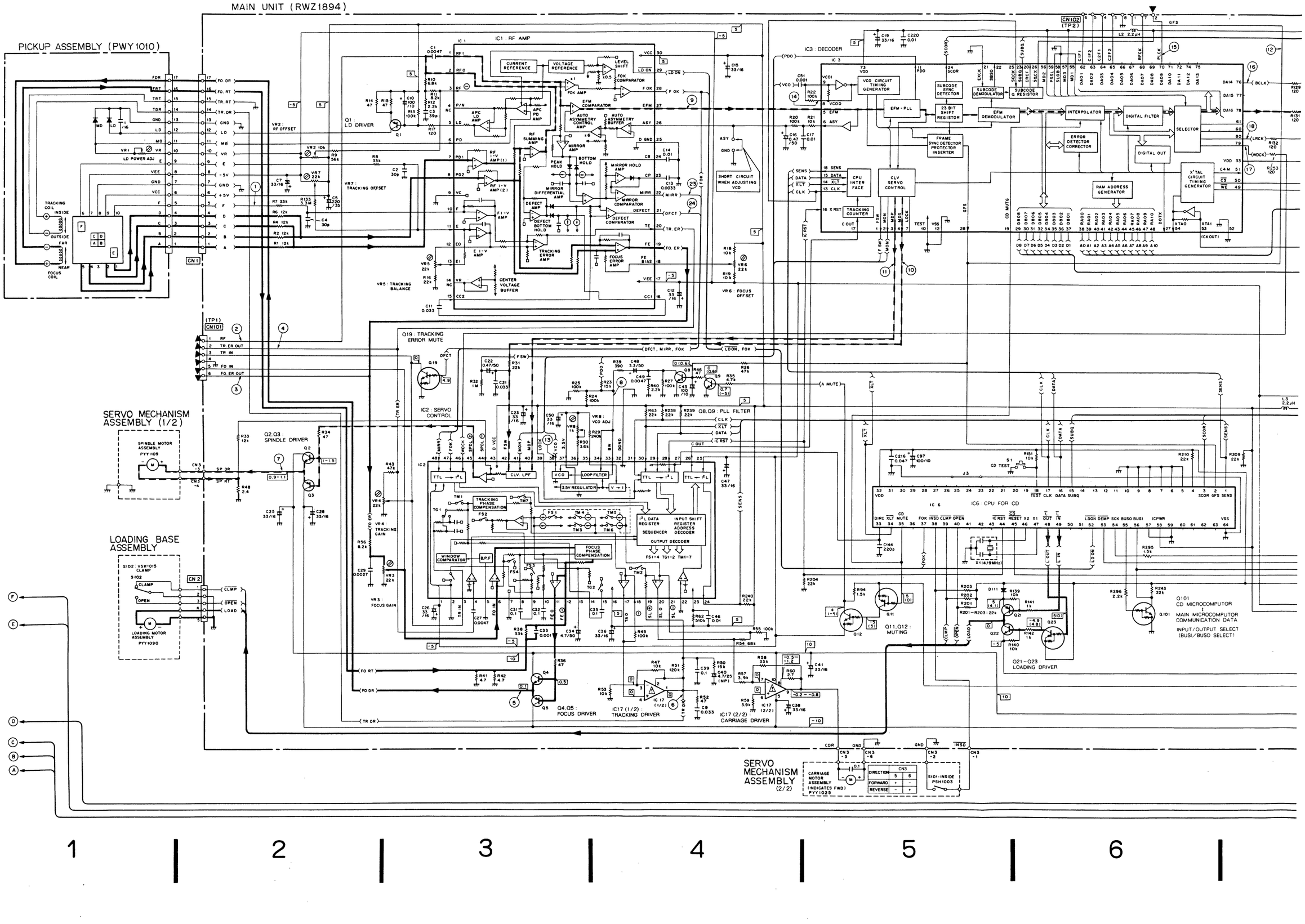
| Pin No. | Voltage | Pin No. | Voltage | Pin No. | Voltage |
|---|---|---|---|---|---|
| 1 | − 5 | 17 | 0 | 33 | 2.5 |
| 2 | − 5 | 18 | 0 | 34 | 2.5 |
| 3 | 0 | 19 | 0 | 35 | 2.3 |
| 4 | 0 | 20 | 0 | 36 | 2.3 |
| 5 | 0 | 21 | 0 | 37 | 3.5 |
| 6 | 0 | 22 | 0 | 38 | 2.4 |
| 7 | 0 | 23 | − 4.1 | 39 | 5 |
| 8 | 0 | 24 | 5 | 40 | 2.5 |
| 9 | 0 | 25 | − 5 | 41 | 5 |
| 10 | 0 | 26 | 0 | 42 | 2.5 |
| 11 | 0 | 27 | 5 | 43 | 5 |
| 12 | 0 | 28 | 5 | 44 | 0 |
| 13 | 0.2 | 29 | 5 | 45 | 0.8 − 1.5 |
| 14 | 0 | 30 | 5 | 46 | 2.5 |
| 15 | 0 | 31 | 5 | 47 | 5 |
| 16 | 5 | 32 | 0 | 48 | 0 |

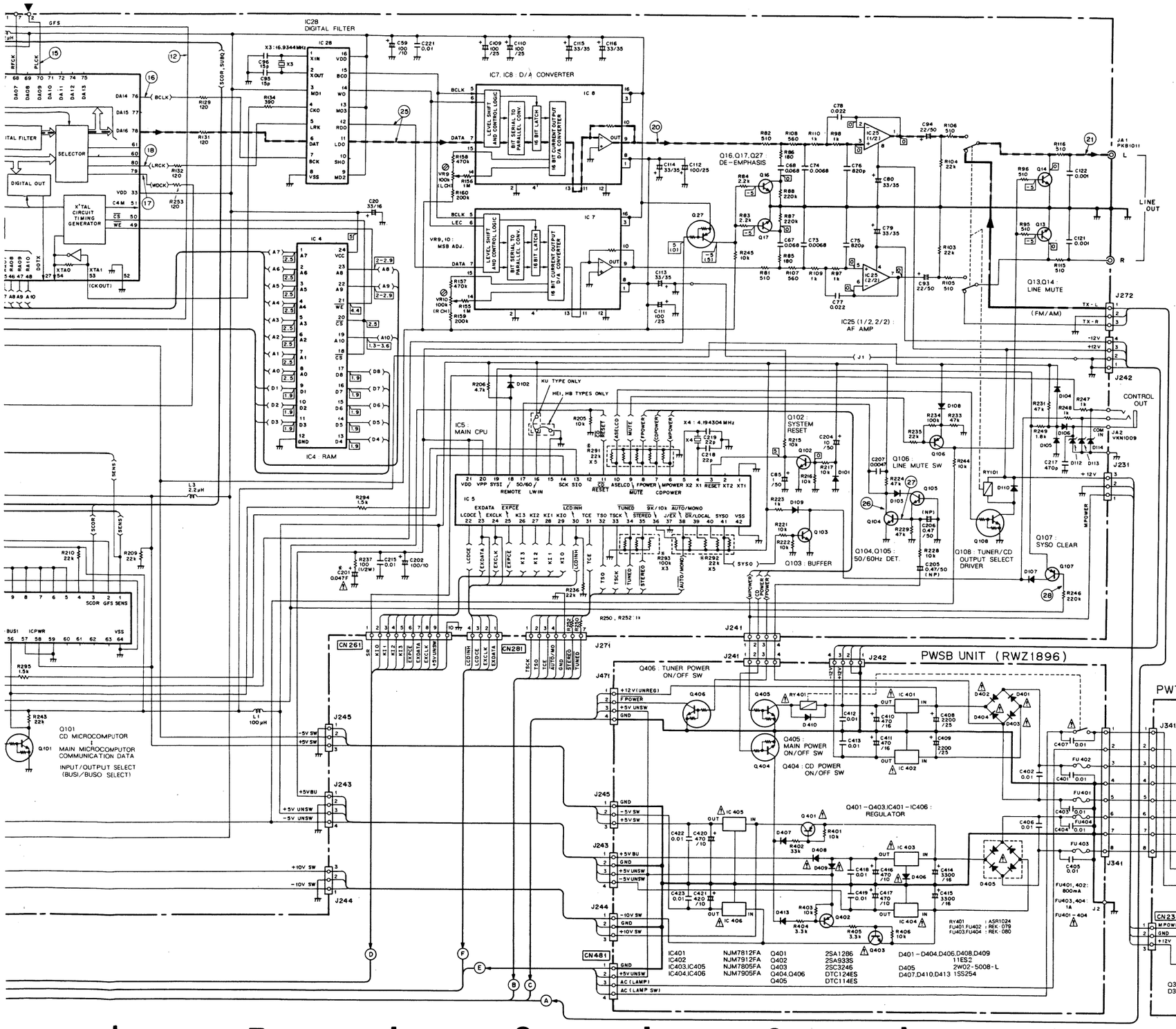
IC3
(CXD1135QZ) (Unit : V)

| Pin No. | Voltage | Pin No. | Voltage |
|---|---|---|---|
| 1 | 2.5 | 41 | 2.5 |
| 2 | 5 | 42 | 2.5 |
| 3 | 2.5 | 43 | 2.5 |
| 4 | 2.8 | 44 | 2.5 |
| 5 | 2.4 | 45 | 2.5 |
| 6 | 2.5 | 46 | 2.0 − 2.9 |
| 7 | 5 | 47 | 2.0 − 2.9 |
| 8 | 2.4 | 48 | 1.3 − 3.6 |
| 9 | 2.4 | 49 | 4.4 |
| 10 | 0 | 50 | 2.5 |
| 11 | 1.8 | 51 | 2.3 |
| 12 | 0 | 52 | 0 |
| 13 | 5 | 53 | 2.2 |
| 14 | 5 | 54 | 2.2 |
| 15 | 5 | 55 | 5 |
| 16 | 5 | 56 | 0 |
| 17 | 0 | 57 | 0 |
| 18 | 5 | 58 | 0 |
| 19 | 0 | 59 | 0 |
| 20 | 5 | 60 | 1.3 |
| 21 | 0 | 61 | 1.3 |
| 22 | 0 | 62 | 0 |
| 23 | 0 | 63 | 0 |
| 24 | 0 | 64 | 0 |
| 25 | 5 | 65 | 0 |
| 26 | 5 | 66 | 0 |
| 27 | 2.5 | 67 | 0 |
| 28 | 5 | 68 | 2.5 |
| 29 | 1.9 | 69 | 2.5 |
| 30 | 1.9 | 70 | 2.3 |
| 31 | 1.9 | 71 | 5 |
| 32 | 1.9 | 72 | 0 |
| 33 | 5 | 73 | 5 |
| 34 | 1.9 | 74 | 0 |
| 35 | 1.9 | 75 | 2.4 |
| 36 | 1.9 | 76 | 2.3 |
| 37 | 1.9 | 77 | 2.3 |
| 38 | 2.5 | 78 | 2.5 |
| 39 | 2.5 | 79 | 2.5 |
| 40 | 2.5 | 80 | 2.5 |

※ Voltages of IC1, IC2 and IC3 are at the PLAY.

## 5.3 MAIN, PWTB, PWSB UNITS AND PICKUP ASSEMBLY




IC28 DIGITAL FILTER
IC7, IC8 : D/A CONVERTER
IC4 : RAM
IC5 : MAIN CPU
Q102 : SYSTEM RESET
Q106 LINE MUTE SW
Q103 : BUFFER
Q104, Q105 : 50/60Hz DET.
Q108 : TUNER/CD OUTPUT SELECT DRIVER
Q107 : SYSO CLEAR
Q16, Q17, Q27 DE-EMPHASIS
IC25 (1/2, 2/2) : AF AMP
Q13, Q14 : LINE MUTE
LINE OUT
CONTROL OUT
Q101 CD MICROCOMPUTOR
MAIN MICROCOMPUTOR COMMUNICATION DATA
INPUT/OUTPUT SELECT (BUSI/BUSO SELECT)
PWSB UNIT (RWZ1896)
Q406 : TUNER POWER ON/OFF SW
Q405 : MAIN POWER ON/OFF SW
Q404 : CD POWER ON/OFF SW
Q401 – Q403, IC401 – IC406 : REGULATOR
PWTB UNIT (RWZ1895)
POWER TRANSFORMER RTT1118
Q301 MAIN POWER ON/OFF SW
AC OUTLET SWITCHED 200W MAX
AC POWER CORD PDG1002

MAIN UNIT

| | |
|---|---|
| IC1 | CXA1081S |
| IC2 | CXA1082BS |
| IC3 | CXD1135QZ |
| IC4 | CXK5816PN-12L |
| IC5 | PD4209 |
| IC6 | PD4210A |
| IC7, IC8 | PCM61P |
| IC17 | TA8410K |
| IC25 | M5218P |
| IC28 | PD0036 |
| Q1, Q3, Q5 | 2SA1399 |
| Q2, Q4 | 2SC3581 |
| Q8, Q9, Q16, Q17, Q102 – Q105 | 2SC1740S |
| Q11, Q23, Q27 | DTA124ES |
| Q12, Q19 | DTC124ES |
| Q13, Q14 | 2SD1302 |
| Q21 | 2SA854S |
| Q22 | 2SC1741S |
| Q101, Q108 | DTC114ES |
| Q106, Q107 | 2SA933S |
| D101 – D110 | 1SS254 |
| D111 | 11ES2 |
| D112 – D114 | MTZ8.2B |
| S1 | : RSG1008 |
| RY101 | : RSR-039 |
| L1 | : LAU101K |
| L2, 3 | : LAU2R2M |
| VR2 | : VRT86VS103 |
| VR3 – VR7 | : VRT86VS223 |
| VR8 | : VRTS6VS102 |
| VR9, VR10 | : VRT86VS104 |
| C201 | : ACH1070 |
| X1 | : VSS1014 |
| X3 | : PSS1001 |
| X4 | : RSS1034 |

▶ : Measuring point
——— : Focus servo loop line
- - - - : Audio signal
——— : Tuner audio signal (FM/AM)
: Tracking servo loop line
: Carriage servo loop line
——— : Loading motor route
- - - - : Spindle servo loop line

IC401 : NJM7812FA
IC402 : NJM7912FA
IC403, IC405 : NJM7805FA
IC404, IC406 : NJM7905FA

Q401 : 2SA1286
Q402 : 2SA933S
Q403 : 2SC3246
Q404, Q406 : DTC124ES
Q405 : DTC114ES

D401 – D404, D406, D408, D409 : 11ES2
D405 : 2W02-5008-L
D407, D410, D413 : 1SS254

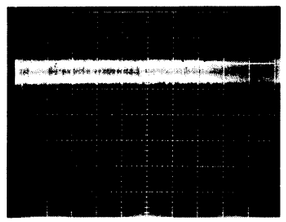
RY401 : ASR1024
FU401, FU402 : REK-079
FU403, FU404 : REK-080

Q301 : DTC114ES
D301 : 1SS254

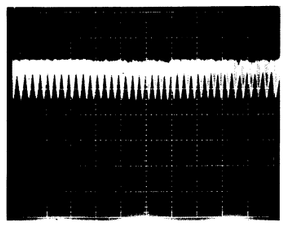
## Wave Forms

NOTE : The encircled numbers denote measuring points in the schematic diagram.

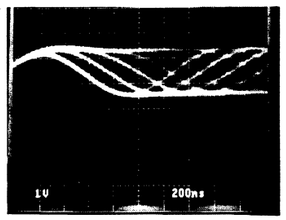
① CN1-5 Pin : PLAY MODE
50mV/div 5msec/div



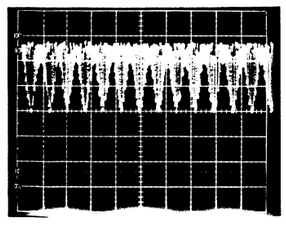
① CN1-5 Pin : SEARCH MODE
50mV/div 5msec/div



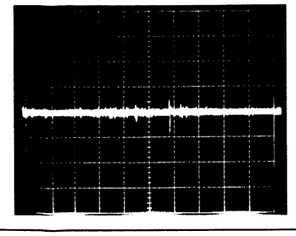
② TP1-1 Pin : PLAY MODE
1V/div 200nsec/div



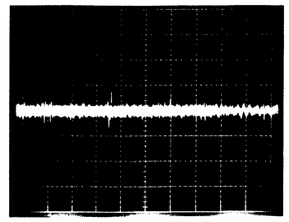

② TP1-1 Pin : SEARCH MODE
500mV/div 100μsec/div



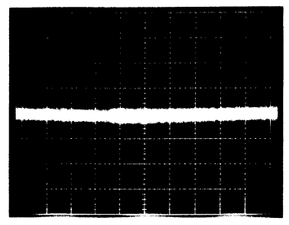
③ TP1-6 Pin : PLAY MODE
500mV/div 10msec/div



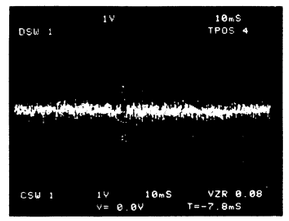
③ TP1-6 Pin : SEARCH MODE
500mV/div 10msec/div



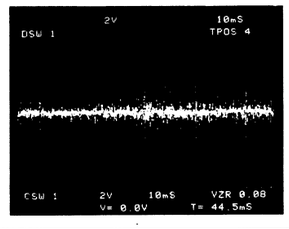
④ TP1-2 Pin : PLAY MODE
1V/div 10msec/div



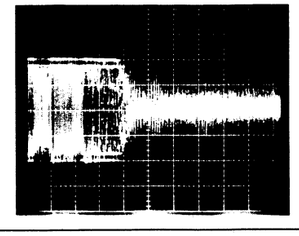
④ TP1-2 Pin : SEARCH MODE
1V/div 10msec/div



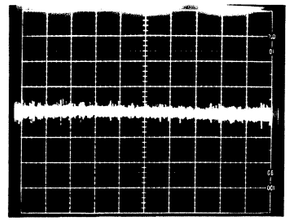

⑤ Q4 Emitter : PLAY MODE
2V/div 10msec/div



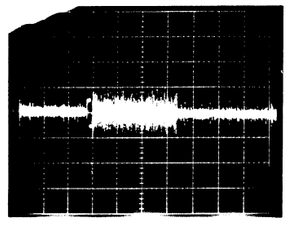

⑤ Q4 Emitter : SEARCH MODE
2V/div 10msec/div



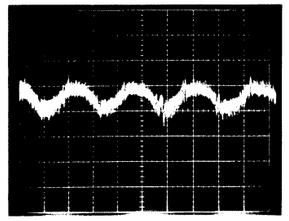
⑥ IC17-1 Pin : PLAY MODE
50mV/div 5msec/div



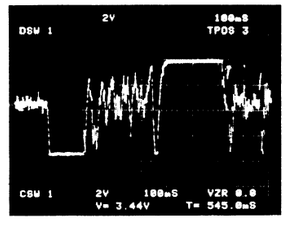
⑥ IC17-1 Pin : PLAY MODE
50mV/div 5msec/div



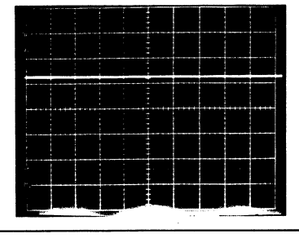
⑦ Q2 Emitter : PLAY MODE
2V/div 50msec/div



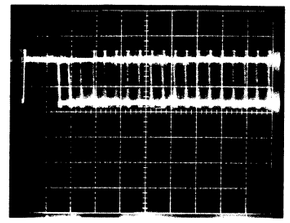
⑦ Q2 Emitter : SEARCH MODE
2V/div 100msec/div



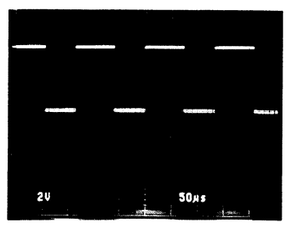

⑧ IC2-33, 34 Pin : PLAY MODE
2V/div 10msec/div



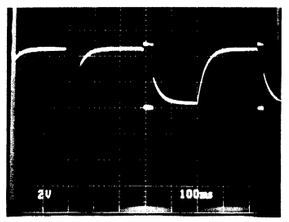
⑨ IC1-27 Pin : PLAY MODE
2V/div 500nsec/div



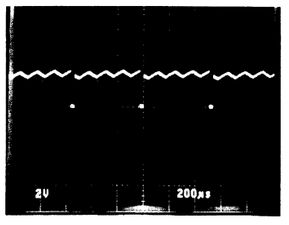
⑩ IC3-4 Pin : PLAY MODE
2V/div 50μsec/div



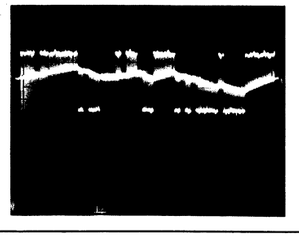

⑩ IC3-4 Pin : SEARCH MODE
2V/div 100msec/div



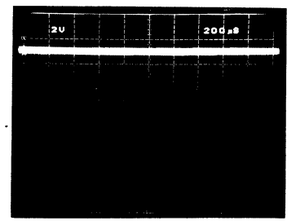

⑪ IC3-3 Pin : PLAY MODE
2V/div 200μsec/div



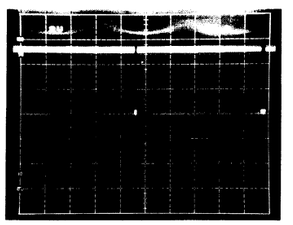

⑪ IC3-3 Pin : SEARCH MODE
2V/div 10msec/div



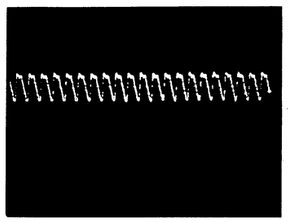
⑫ TP2-1 Pin : PLAY MODE
2V/div 200μsec/div



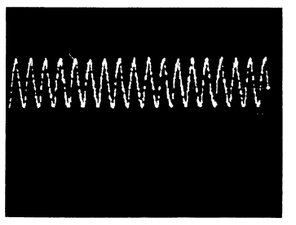

⑫ TP2-1 Pin : SEARCH MODE
2V/div 20msec/div



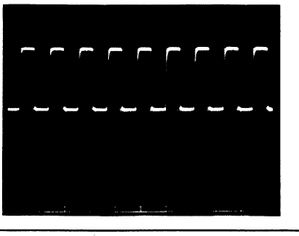
⑬ IC2-38 Pin : PLAY MODE
2V/div 200nsec/div



⑭ IC3-8 Pin : PLAY MODE
2V/div 200nsec/div

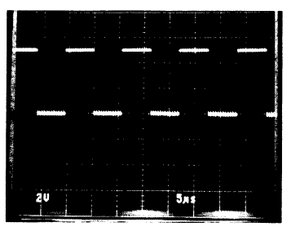


⑮ TP2-2 Pin : PLAY MODE
2V/div 200nsec/div

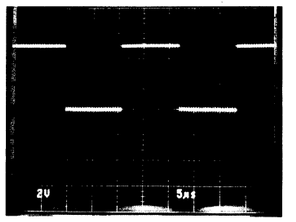


⑯ IC3-76 Pin : STOP MODE
2V/div 200nsec/div

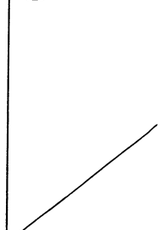
⑰ IC3-79 Pin : STOP MODE
2V/div 5μsec/div



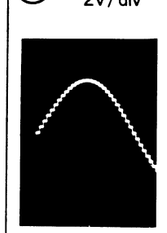

⑱ IC3-80 Pin : STOP MODE
2V/div 5μsec/div



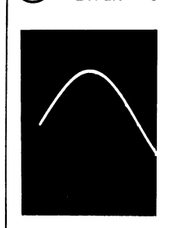

⑲



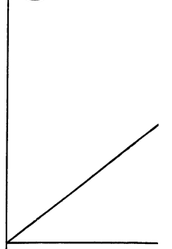
⑳ IC8-9 Pin :
2V/div



㉑ OUTPUT Lch
2V/div 5

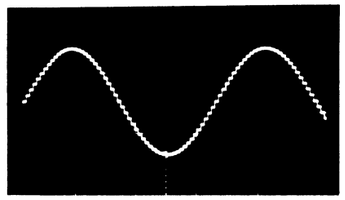


㉒

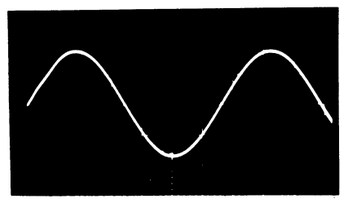


⑲

⑳ IC8-9 Pin : PLAY MODE
2V/div 50μsec/div

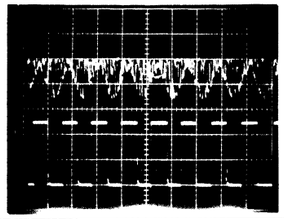


㉑ OUTPUT Lch : PLAY MODE
2V/div 50μsec/div

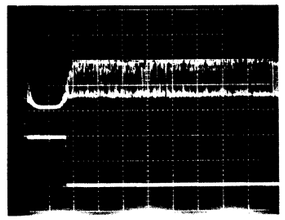


㉒

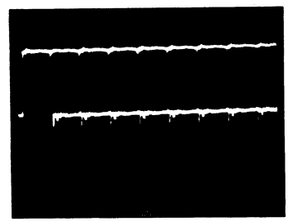
㉓ IC1-22 Pin : TRACKING OPEN
0.1msec/div
Upper TP1-1 Pin : 1V/div
Lower IC1-22 Pin : 2V/div



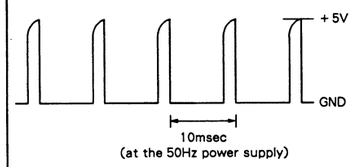
㉔ IC1-21 Pin : DFCT 0.5msec/div
Upper TP1-1 Pin : 1V/div
Lower IC1-21 Pin : 5V/div



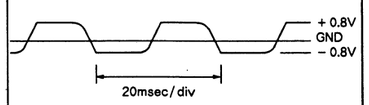
㉕ IC28-11, 12 Pin : PLAY MODE
2V/div 0.1μsec/div



㉖ Q104 Collector : All the time




㉗ Q104 Base : All the time



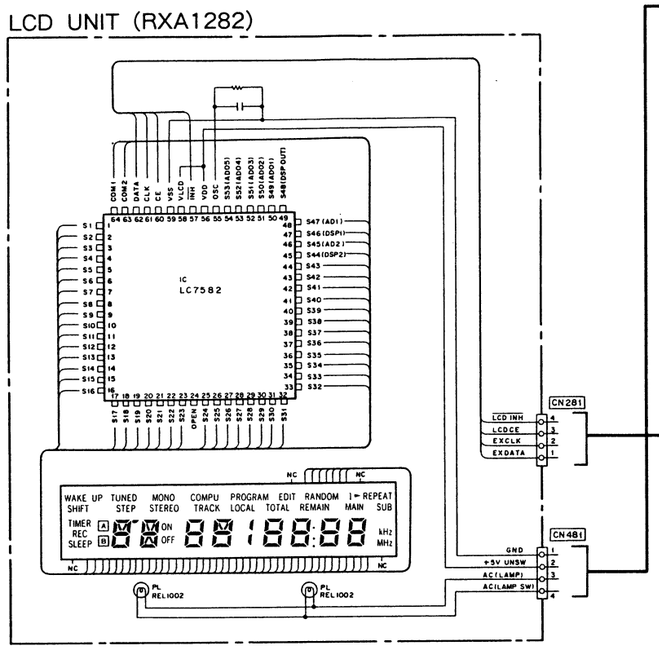

㉘ Q107 Base : POWER ON in a moment

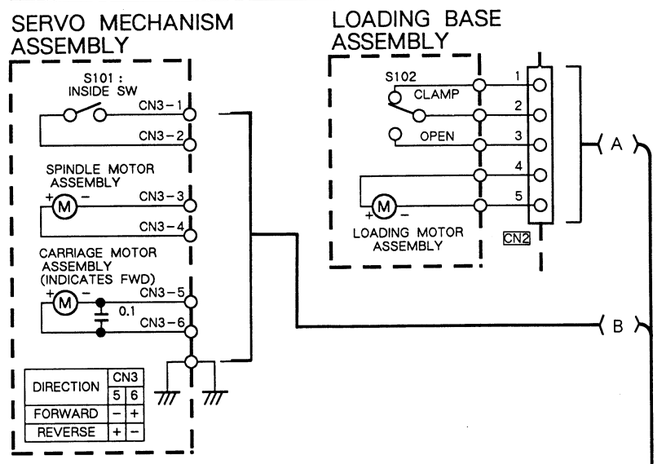
# 6. P. C. BOARDS CONNECTION DIAGRAM

Note : For the voltages which parts have to ＊marked,
refer to the tables of the voltage (pages 17 and 18.)

| P.C.B. pattern diagram indication | Corresponding part symbol | Part name | P.C.B. pattern diagram indication | Corresponding part symbol | Part name |
|---|---|---|---|---|---|
| | | Transistor | | | Ceramic capacitor |
| | | FET | | | Mylar capacitor |
| | | Diode | | | Styrol capacitor |
| | | Zenner diode | | | Electrolytic capacitor (Non polarized) |
| | | LED | | | Electrolytic capacitor (Noiseless) |
| | | Varactor | | | Electrolytic capacitor (Polarized) |
| | | Tact switch | | | Electrolytic capacitor (Polarized) |
| | | Inductor | | | Power capacitor |
| | | Coil | | | Semi-fixed resistor |
| | | Transformer | | | Resistor array |
| | | Filter | | | Resistor |
| | | | | | Resonator |
| | | | | | Thermistor |

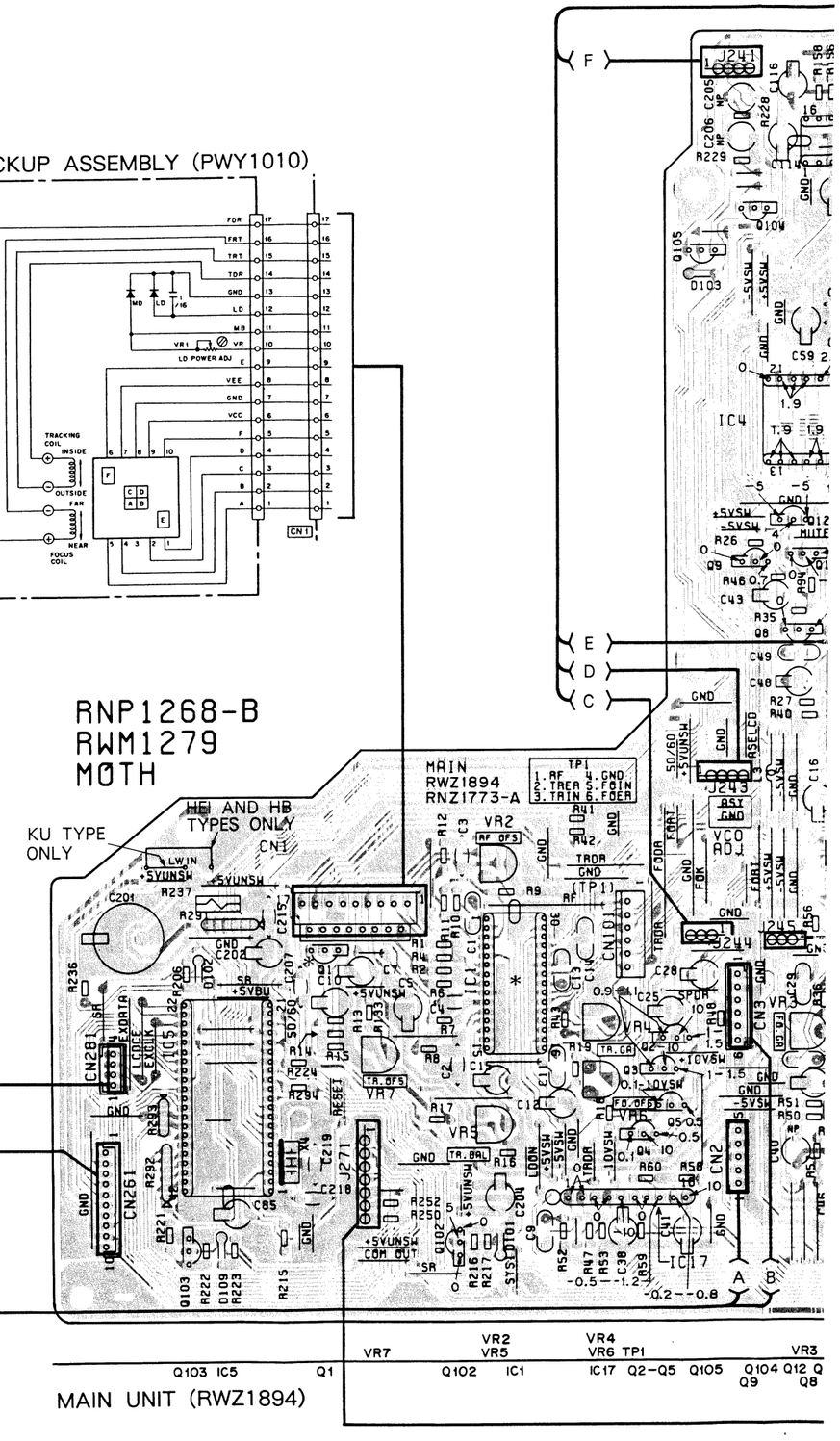
1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with ○ shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

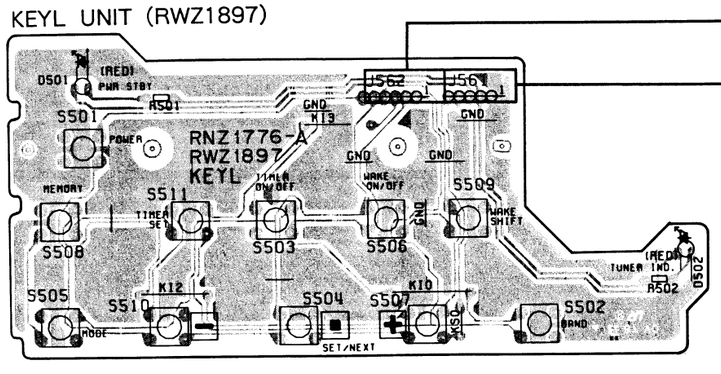


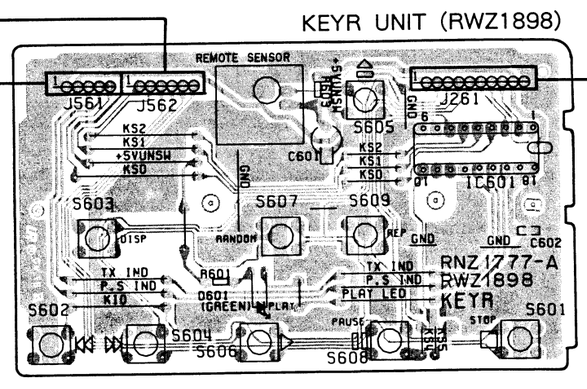









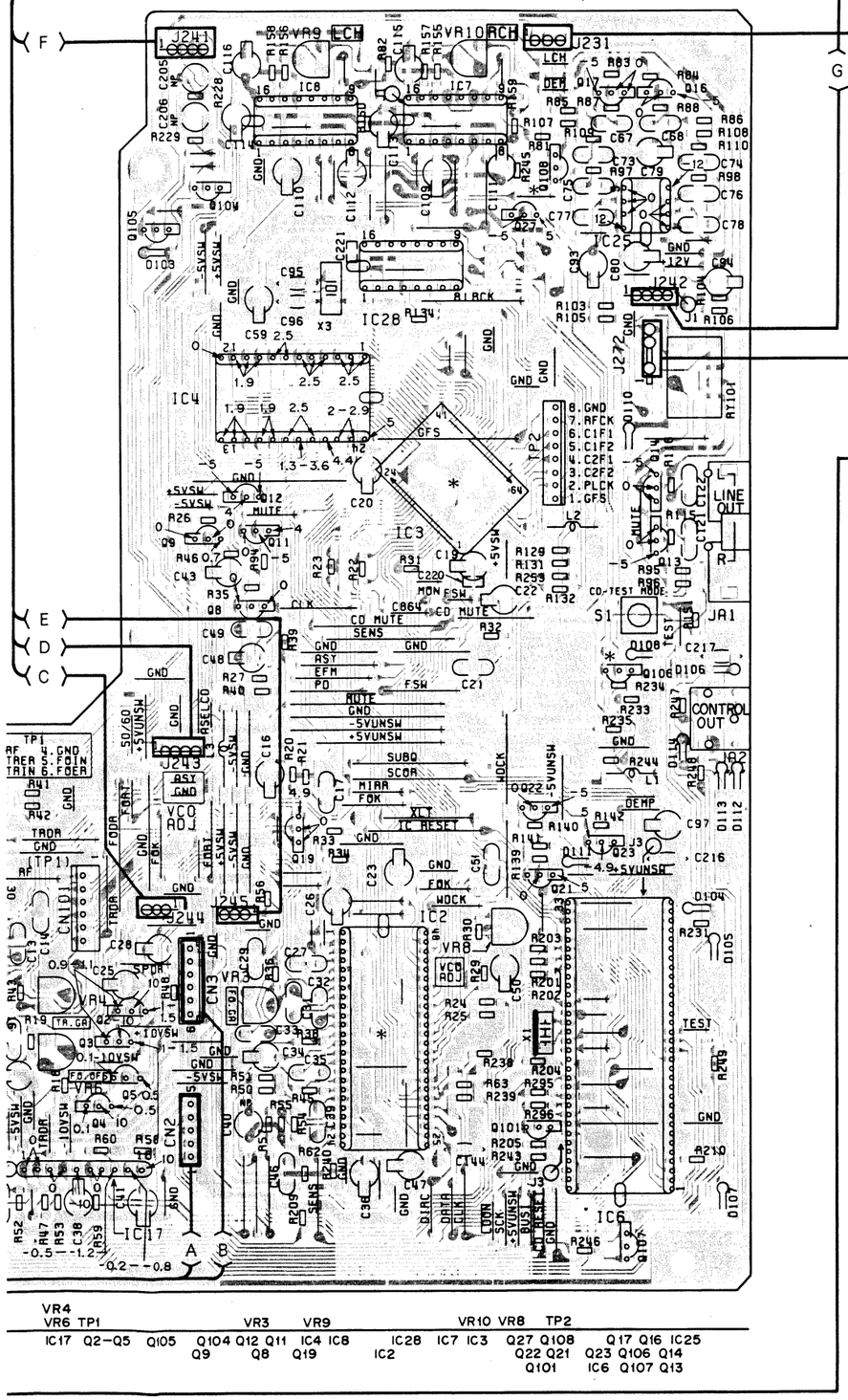



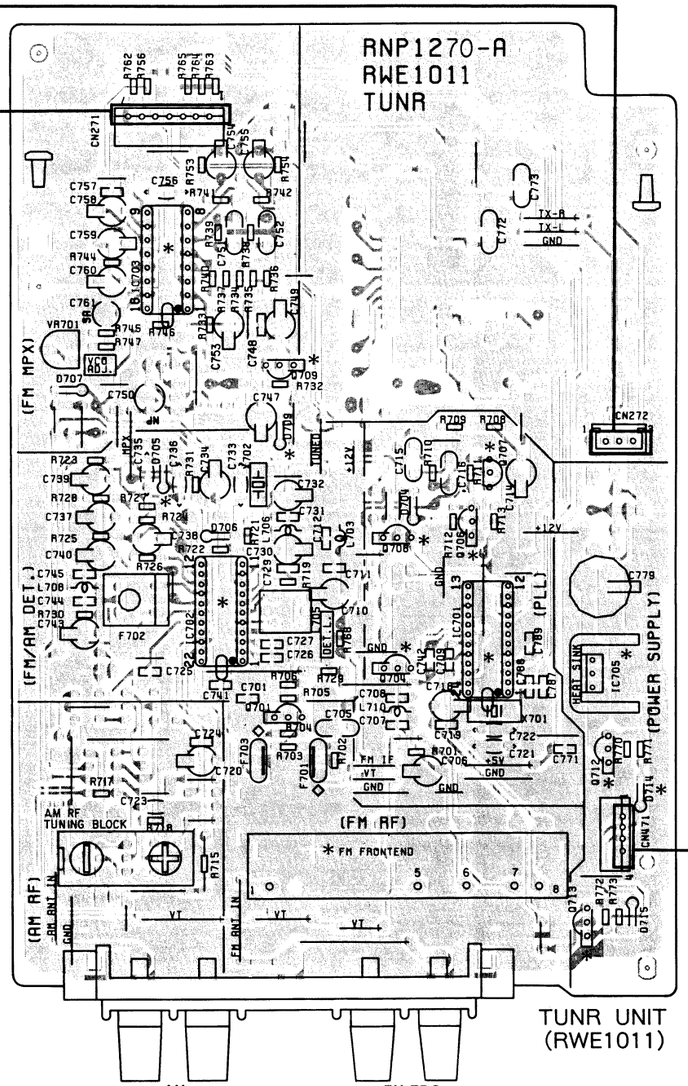



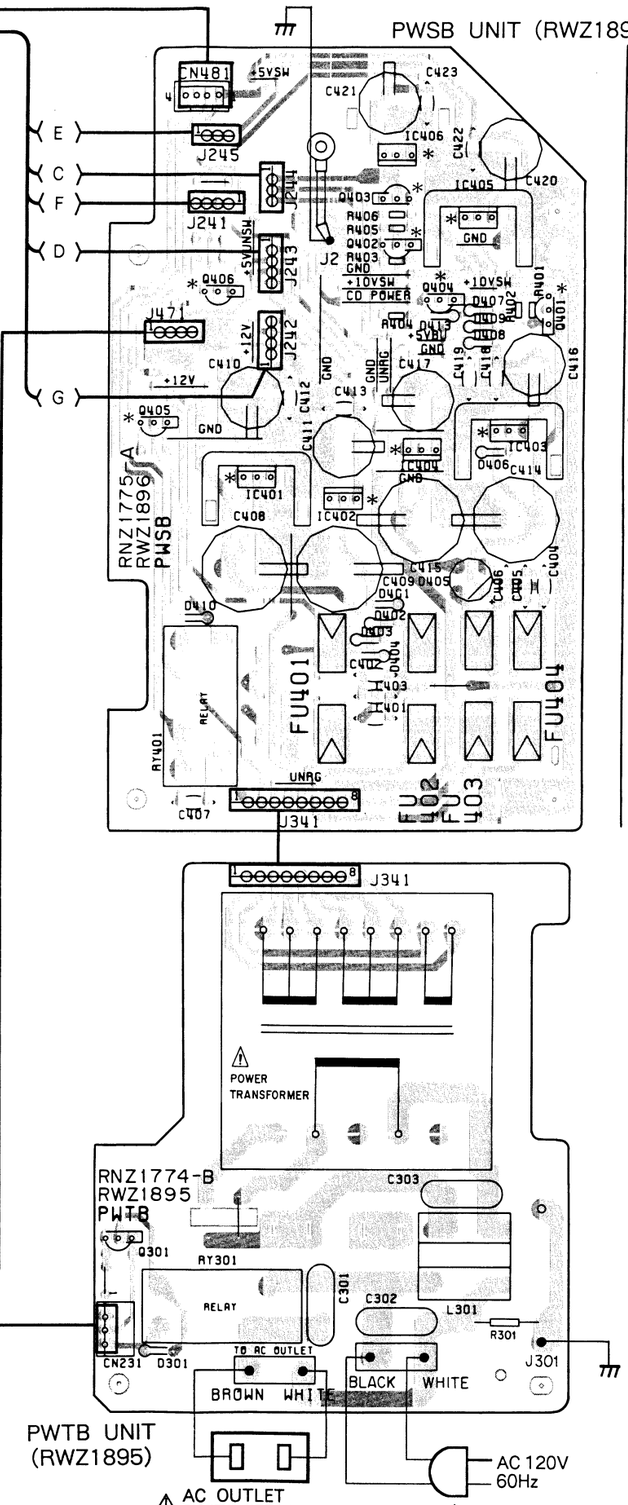
7 8 9 10 11 12

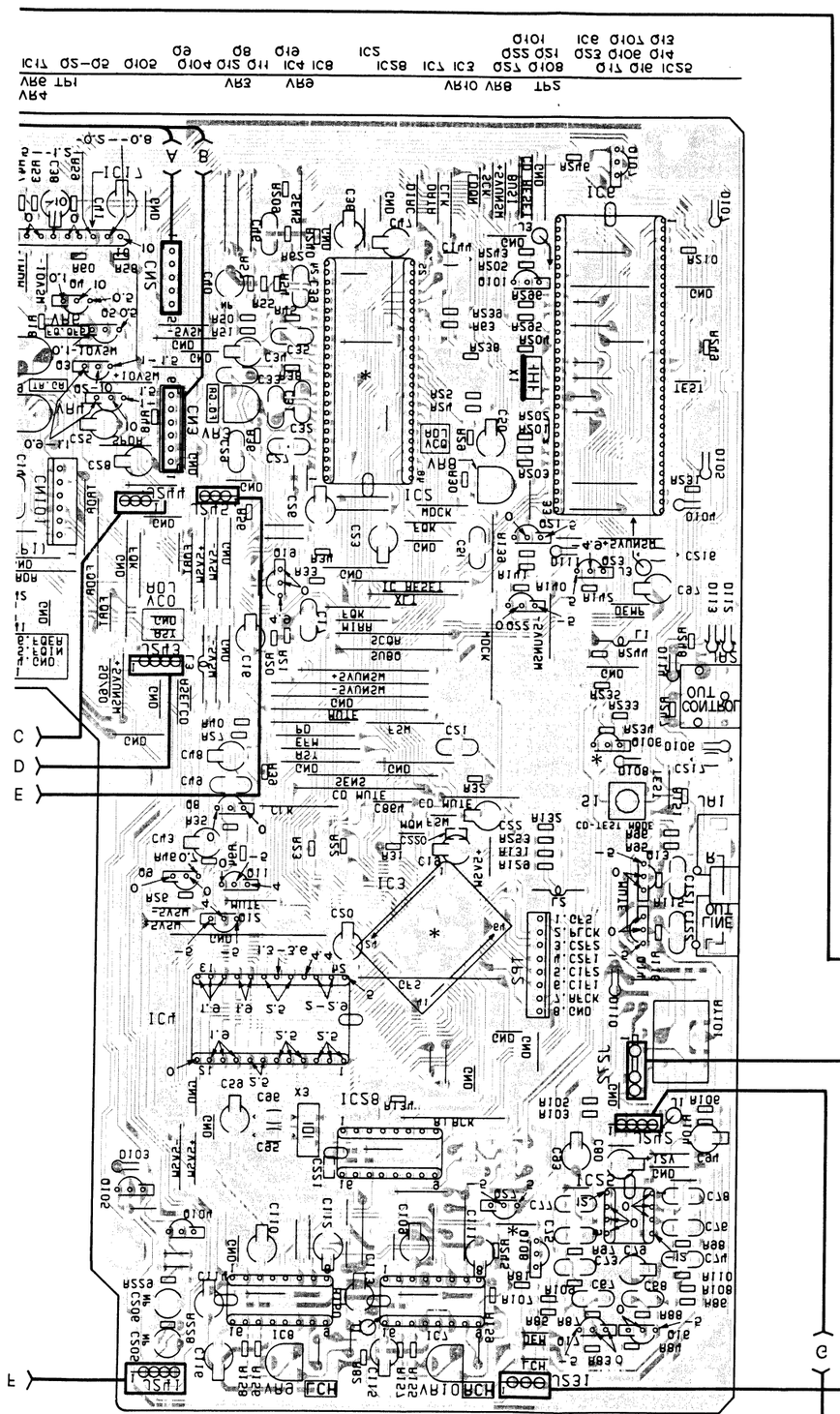
A B C D

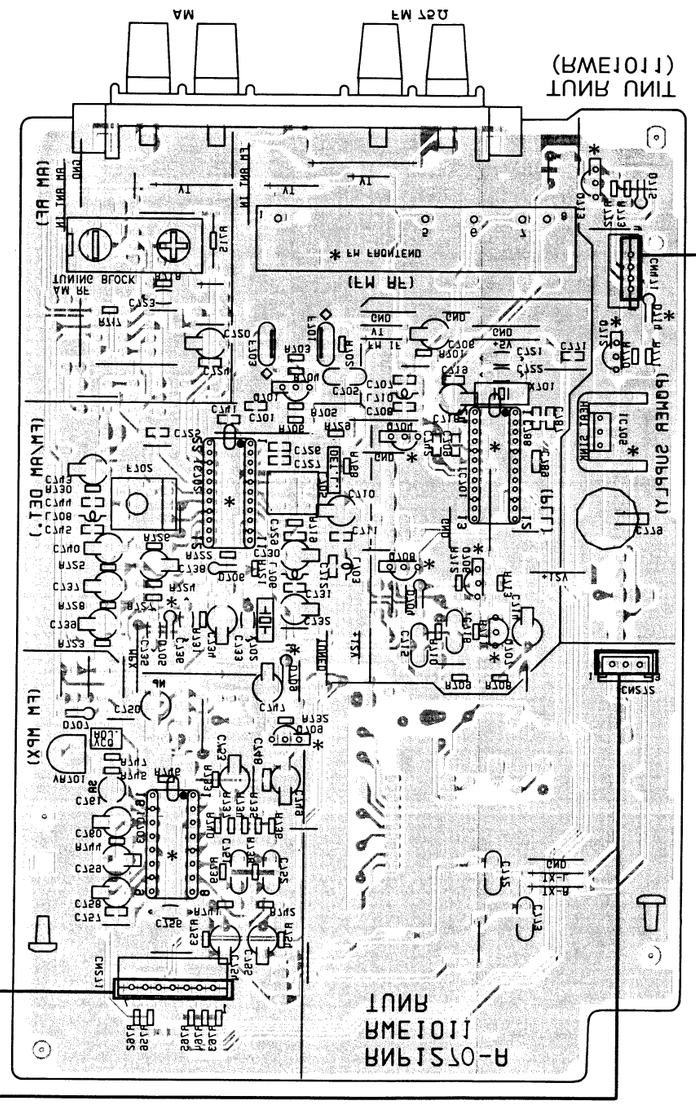
30

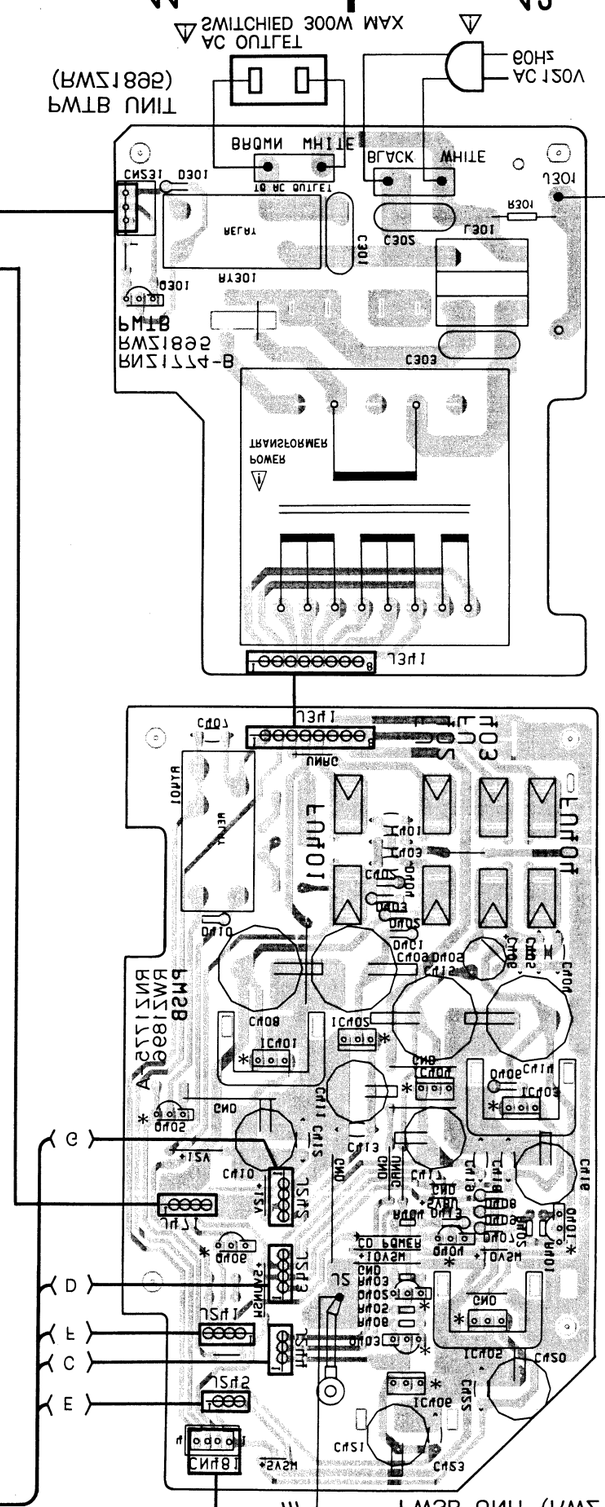








PWSB UNIT (RWZ1898)

# P. C. BOARDS CONNECTION DIAGRAM

Note : For the voltages which have to *marked, refer to the tables of the voltage (pages 17 and 18.)

This P. C. B. connection diagram is viewed from the foil side.

KEY UNIT (VWZ1897)

KEY UNIT (VWZ1898)

MAIN UNIT (VWZ1894)

SERVO MECHANISM ASSEMBLY

LOADING BASE ASSEMBLY

LCD UNIT (RXA1585)

PICKUP ASSEMBLY (VWY1010)

# 7. ELECTRICAL PARTS LIST

NOTES :
- Parts without part number cannot be supplied.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560 Ω → 56 × $10^1$ → 561 ..... RD1/4PS 5 6 1 J
47k Ω → 47 × $10^3$ → 473 ..... RD1/4PS 4 7 3 J
0.5 Ω → 0R5 ..... RN2H 0 R 5 K
1 Ω → 010 ..... RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω → 562 × $10^1$ → 5621 ..... RN1/4SR 5 6 2 1 F

## Miscellaneous Parts

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | TUNR unit | RWE1011 |
| | MAIN unit | RWZ1894 |
| | PWSB unit | RWZ1896 |
| | KEYL unit | RWZ1897 |
| | KEYR unit | RWZ1898 |
| | PWTB unit | RWZ1895 |
| | LCD unit | RXA1282 |
| | IC | LC7582 |
| | Lamp | REL1002 |
| ⚠ | FU401,FU402 Fuse (800mA) | REK-079 |
| ⚠ | FU403,FU404 Fuse (1A) | REK-080 |
| | S102 Leaf switch (CLAMP) | VSK-015 |
| | S101 Slide switch (INSIDE) | PSH1003 |
| ⚠ | Strain relief | CM-22C |
| ⚠ | AC power cord | PDG1002 |
| ⚠ | 1P AC outlet | AKP-507 |
| ⚠ | Power transformer | RTT1118 |
| | Motor (CARRIAGE, LOADING) | PXM1002 |
| | Pickup assembly | PWY1010 |
| | Motor assembly (CARRIAGE) | PYY1025 |
| | Motor assembly (with oil, SPINDLE) | PYY1109 |
| | Motor assembly (LOADING) | PYY1090 |

## TUNR Unit (RWE1011)

### SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | IC703 | AN7470P |
| | IC702 | LA1265S |
| | IC701 | LC7218 |
| ⚠ | IC705 | NJM7812FA |
| | Q704,Q708 | DTA143ES |
| ⚠ | Q712,Q713 | 2SA1286 |
| | Q709 | 2SC1740S |
| | Q706 | 2SC1740SLN |
| | Q701 | 2SC2668 |
| | Q707 | 2SK246 |
| | D704 – D707,D709,D714,D715 | 1SS254 |

### COILS AND FILTERS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | L705 FM detection coil | ATE-079 |
| | L710 | LAU2R2M |
| | L703,L706,L708 | LAU680K |
| | F701,F703 FM ceramic filter | ATF-107 |
| | F702 AM ceramic filter | ATF-208 |

### CAPACITORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | C721,C722 | CCCCH270J50 |
| | C733 | CCCSL221J50 |
| | C709,C741 | CCPUSL470J50 |
| | C750 | CEANP100M16 |
| | C732 | CEASR10M50 |
| | C758 | CEASR47M50 |
| | C734 | CEAS010M50 |
| | C759 | CEAS1R5M50 |
| | C743,C754,C755 | CEAS100M50 |
| | C718 | CEAS101M10 |
| | C779 | CEAS102M16 |
| | C737 | CEAS2R2M50 |
| | C739,C740,C760 | CEAS4R7M50 |
| | C706,C710,C714,C720,C730,C738, C747,C749,C753 | CEAS470M16 |
| | C715 | CFTXA224J50 |
| | C705 | CFTXA104J50 |
| | C716 | CFTXA103J50 |
| | C736 | CKCYB222K50 |
| | C723,C735,C756 | CKCYF473Z50 |
| | C787 – C789 | CKPUYB101K50 |
| | C707,C708,C711,C712,C719,C729, C731,C742,C744,C745,C748 | CKPUYF103Z25 |
| | C701,C724 – C727,C757,C771 | CKPUYF223Z25 |
| | C751,C752 | CQMA182J50 |
| | C772,C773 | CQMA562J50 |
| | C761 | CQSA471J50 |

### RESISTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | VR701 Semi-fixed (4.7kΩ) | VRTB6VS472 |
| | Other resisitors | RD1/6PM □□□J |

### OTHERS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | CN271 7P jumper connector | KPC7 |
| | X701 Crystal resonator (7.2MHz) | ASS-025 |
| | X702 Ceramic filter (450kHz) | ATF-125 |
| | 4P antenna terminal | AKA1009 |
| | FM Front end | RWB1002 |
| | AM RF tuning block | AXX1011 |

## MAIN Unit (RWZ1894)

### SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | IC1 | CXA1081S |
| | IC2 | CXA1082BS |
| | IC3 | CXD1135QZ |
| | IC4 | CXK5816PN-12L |
| | IC25 | M5218P |
| | IC7,IC8 | PCM61P |
| | IC28 | PD0036 |
| | IC5 | PD4209 |
| | IC6 | PD4210A |
| ⚠ | IC17 | TA8410K |
| | Q11,Q23,Q27 | DTA124ES |
| | Q101,Q108 | DTC114ES |
| | Q12,Q19 | DTC124ES |
| | Q1,Q3,Q5 | 2SA1399 |
| | Q21 | 2SA854S |
| | Q106,Q107 | 2SA933S |
| | Q8,Q9,Q16,Q17,Q102 – Q105 | 2SC1740S |
| | Q22 | 2SC1741S |
| | Q2,Q4 | 2SC3581 |
| | Q13,Q14 | 2SD1302 |
| | D101 – D110 | 1SS254 |
| | D112 – D114 | MTZ8.2B |
| | D111 | 11ES2 |

### SWITCH AND RELAY

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | S1 Tact switch (CD-TEST) | RSG1008 |
| | RY101 Miniature relay | RSR-039 |

### COILS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | L1 | LAU101K |
| | L2,L3 | LAU2R2M |

### CAPACITORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | C95,C96 | CCCCH150J50 |
| | C218,C219 | CCCCH220J50 |
| | C2,C4 | CCCCH300J50 |
| | C3 | CCCCH390J50 |
| | C144 | CCCSL221J50 |
| | C217 | CCDSL471J50 |
| | C205,C206 | CEANPR47M50 |
| | C40 | CEANP4R7M25 |
| | C16,C22 | CEASR47M50 |
| | C85 | CEAS010M50 |
| | C204 | CEAS100M50 |
| | C10,C43,C59,C97,C202 | CEAS101M10 |
| | C109 – C112 | CEAS101M25 |
| | C5 | CEAS221M35 |
| | C48 | CEAS3R3M50 |
| | C7,C12,C15,C19,C20,C23,C25, C26,C28,C36,C38,C41,C47,C50 | CEAS330M16 |
| | C79,C80,C113 – C116 | CEAS330M35 |
| | C34 | CEAS4R7M50 |
| | C93,C94 | CEYA220M50 |
| | C216 | CGCYX473K25 |
| | C207 | CKCYB472K50 |
| | C215 | CKCYF103Z50 |
| | C220,C221 | CKPUYF103Z25 |
| | C33,C51,C121,C122 | CQMA102J50 |
| | C14,C17,C46 | CQMA103K50 |
| | C31,C32,C35,C39 | CQMA104K50 |
| | C77,C78 | CQMA223J50 |
| | C29 | CQMA272J50 |
| | C13 | CQMA332J50 |
| | C9,C11,C21 | CQMA333K50 |
| | C1,C27,C49 | CQMA472J50 |
| | C73,C74 | CQMA682J50 |
| | C67,C68 | CQMA683J50 |
| | C75,C76 | CQMA821J50 |
| | C201 (0.047F/5.5V) | ACH1070 |

### RESISTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | VR2 Semi-fixed (10kΩ) | VRTB6VS103 |
| | VR9,VR10 Semi-fixed (100kΩ) | VRTB6VS104 |
| | VR3–VR7 Semi-fixed (22kΩ) | VRTB6VS223 |
| | VR8 Semi-fixed (1kΩ) | VRTS6VS102 |
| | R291,R292 Resistor array | RA5T223J |
| | R293 Resistor array | RA3T104J |
| ⚠ | R237 | RD1/2PM101J |
| | R30 | RN1/6PQ3601F |
| | Other resistors | RD1/6PM□□□J |

### OTHERS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | X3 Crystal resonator (16.9344MHz) | PSS1001 |
| | X1 Ceramic resonator (4.19MHz) | VSS1014 |
| | X4 Crystal resonator (4.194304MHz) | RSS1034 |
| | JA1 2P pin jack | PKB1011 |
| | JA2 Stereo mini headphone jack | VKN1009 |
| | CN1 Flexible connector | 5597-17APB |

## PWSB Unit (RWZ1896)

### SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| ⚠ | IC403,IC405 | NJM7805FA |
| ⚠ | IC401 | NJM7812FA |
| ⚠ | IC404,IC406 | NJM7905FA |
| ⚠ | IC402 | NJM7912FA |
| | Q405 | DTC114ES |
| | Q404,Q406 | DTC124ES |
| ⚠ | Q401 | 2SA1286 |
| | Q402 | 2SA933S |
| ⚠ | Q403 | 2SC3246 |
| ⚠ | D401 – D404,D406,D408,D409 | 1ES2 |
| | D407,D410,D413 | 1SS254 |
| ⚠ | D405 | 2W02-5008-L |

### RELAY

| Mark | Symbol & Description | Part No. |
|---|---|---|
| ⚠ | RY401 Relay | ASR1024 |

### CAPACITORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | C414,C415 | CEAS332M16 |
| | C416,C417,C420,C421 | CEAS471M10 |
| | C410,C411 | CENA471M16 |
| | C408,C409 | CEZA222M25 |
| | C401 – C407,C412,C413,C418, C419,C422,C423 | CKCYF103Z50 |

### RESISTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | All resistors | RD1/6PM□□□J |

## KEYL Unit (RWZ1897)

### SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | D501,D502 | MVR3868S |

### SWITCHES

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | S501 – S511 Tact switch (POWER, BAND, TIMER ON/OFF, TIMER MODE, WAKE ON/OFF, +, MEMORY, WAKE SHIFT, –, TIMER SET, TUNING SET/NEXT) | RSG1008 |

### RESISTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | R501,R502 | RD1/6PM201J |

## KEYR Unit (RWZ1898)

### SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | IC601 | PD0012A |
| | D601 | MPG3868S |

### SWITCHES

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | S601 – S609 Tact switch (STOP(□), TRACK SEARCH (⏮, ⏭), DISPLAY/CLOCK ADJ, OPEN/CLOSE (⏏), PLAY (▷), RANDOM, PAUSE (⏸), REPEAT) | RSG1008 |

### CAPACITORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | C601 | CEAL101M6R3 |
| | C602 | CKPUYF103Z25 |

### RESISTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | R601,R603 | RD1/6PM□□□J |

### OTHERS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | IR sensor unit | GP1U50X |

## PWTB Unit (RWZ1895)

### SEMICONDUCTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | Q301 | DTC114ES |
| | D301 | 1SS254 |

### RELAY

| Mark | Symbol & Description | Part No. |
|---|---|---|
| ⚠ | RY301 Relay | ASR1024 |

### COIL

| Mark | Symbol & Description | Part No. |
|---|---|---|
| ⚠ | L301 Line filter | VTL-262 |

### CAPACITORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| ⚠ | C301 – C303 Ceramic (0.01μ/400V AC) | VCG-044 |

### RESISTORS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| ⚠ | R301 | RD1/2PM225J |

### OTHERS

| Mark | Symbol & Description | Part No. |
|---|---|---|
| | CN231 3P jumper connector | KPC3 |

# 8. ADJUSTMENTS

## 8.1 CD SECTION ADJUSTMENTS

The adjustments for this unit are given below. Adjustments must be made in the order in which they are listed.

### ● Adjustments and check items

1. Tracking offset, focus offset and RF offset adjustment
2. RF level adjustment
3. LD (Laser Diode) power check
4. Focus lock and spindle lock check
5. Grating adjustment
6. Tracking balance adjustment
7. Tangential adjustment
8. Focus gain adjustment
9. Tracking gain adjustment
10. VCO free-run frequency adjustment
11. Method for confirming S character (focus error)
12. MSB adjustment

### ● Measuring equipment

1. Dual trace oscilloscope
2. Optical power meter
3. Test disc (YEDS-7), 8 cm disc
4. Loop gain adjustment filter
5. Signal generator
6. Frequency counter
7. Other regular measuring equipment

### ● About the test mode

There are following two ways of entering the CD test mode.
① In the STANDBY condition. Then push S501 (POWER) while pressing the test mode switch (S1) to turn on the power.
② In the tuner mode, push □ (STOP key) while pressing the test mode switch (S1).
To release the CD test mode, push either the BAND key or the POWER switch (S501). (OFF)

In the test mode, each key functions as shown in Table 8-1 and "TEST" is displayed.

### ● Adjustment VRs and their names

VR1 : Laser power
VR2 : RF offset (RF. OFS)
VR3 : Focus gain (FCS. GAN)
VR4 : Tracking gain (TRK. GAN)
VR5 : Tracking balance (TRK. BAL)
VR6 : Focus offset (FCS. OFS)
VR7 : Tracking offset (TRK. OFS)
VR8 : VCO adjustment (VCO. ADJ)
VR9 : MSB adjustment (L ch)
VR10 : MSB adjustment (R ch)

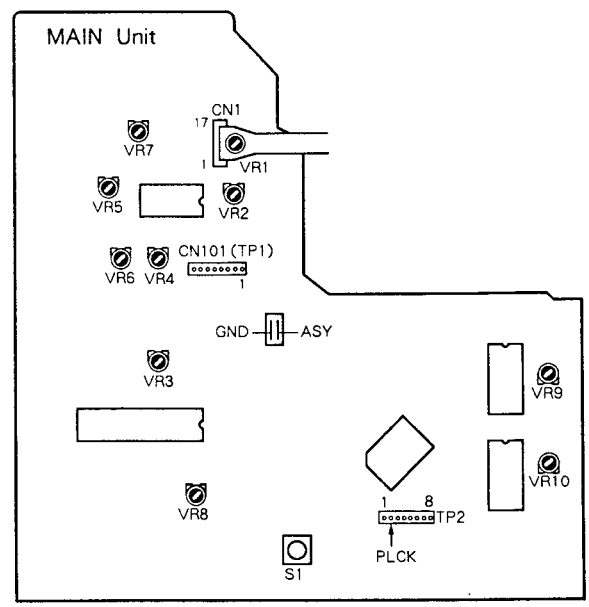
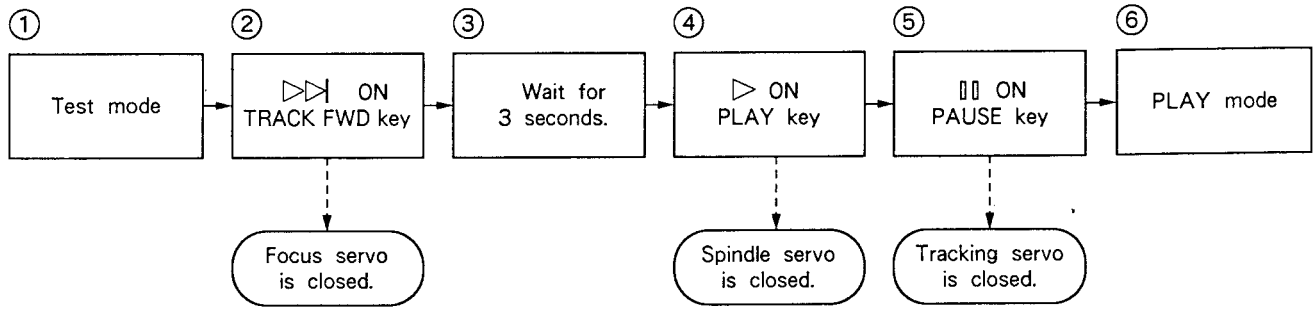



Fig. 8-1 Adjustment point

In the test mode, the servos must be closed and opened individually. Consequently, the servos must each be closed in the proper sequence (serial sequence) in order to put the machine into the play mode. Note also that the machine will not enter the play mode when the PAUSE (▯▯) key is pressed.

For example, in order to change from the stop to the play mode, the function keys must be pressed in the following order.

* In the test mode, the servos must be operated in serial sequence.




## • Key Functions in Test Mode

| Symbol | Key name | Function in test mode | Description |
|---|---|---|---|
| ▷▷\| | TRACK FWD | Focus servo close | Turns ON the laser diode, and raises and lowers the focusing actuator to close the focus servo. |
| ▷ | PLAY | Spindle servo close | Closes the servo in the CLV-A mode after kicking the spindle motor. |
| ▯▯ | PAUSE | Tracking servo close/open | Acts as a toggle : closes the tracking servo and activates play mode when pressed (provided the focus and spindle servos are closed), at which time the PLAY indicator illuminates ; opens the tracking servo when pressed again. |
| RANDOM *1 | RANDOM PLAY | Carriage reverse (moves inward) | Moves carriage quickly (3cm/s) toward innermost track. Be careful not to move too far as there is no safety device to stop the carriage. |
| REPEAT *2 | REPEAT | Carriage forward (moves outward) | Moves carriage quickly (3cm/s) toward outermost track. Be careful not to move too far as there is no safety device to stop the carriage. |
| □ | STOP | Stop | Stops all servos and returns system to its initial state. However, pickup does not return to rest on STOP. |
| ⏏ | OPEN/CLOSE | Disc tray open/close | Opens and closes the disc tray. However, pickup does not return to rest on OPEN, and it remains stationary on CLOSE. |

*1 : This unit use the "RANDOM" key, and the remote control use the "◁◁ MANUAL SEARCH REV" and "RANDOM" keys.
*2 : This unit use the "REPEAT" key, and the remote control use the "▷▷ MANUAL SEARCH FWD" and "REPEAT" keys.

Table 8-1

| Step No. | Oscilloscope Setting V | Oscilloscope Setting H | Test Points | Adjusting Points | Check items/ Adjustment specifications | Adjustment procedure |
|---|---|---|---|---|---|---|
| **1** | **Tracking offset, focus offset and RF offset adjustment** | | | | | |
| | | | TP1<br>Pin 2<br>(TRK. ERR)<br>TP1<br>Pin 6<br>(FCS. ERR)<br>TP1<br>Pin 1<br>(RF OUTPUT) | VR5<br>(TRK. BAL)<br>VR7<br>(TRK. OFS)<br>VR6<br>(FCS. OFS)<br>VR2<br>(RF. OFS) | Tracking offset<br>45°<br>0V ± 50mV<br>FOCUS offset<br>0V ± 50mV<br>RF offset<br>100mV ± 50mV | ● Put unit in the test mode. (※)<br>● Set VR5 TRK. BAL (tracking balance) to the position about 45° to the left of center.<br>● Adjust VR7 TRK. OFS (tracking offset) so that the TRK. ERR (tracking error) voltage at TP1 pin 2 becomes 0V ± 50mV.<br>● Adjust VR6 FCS. OFS (focus offset) so that the FCS. ERR (focus error) voltage at TP1 pin 6 becomes 0V ± 50mV.<br>● Adjust VR2 RF. OFS (RF offset) so that the RF output voltage at TP1 pin 1 becomes 100mV ± 50mV.<br><br>Note : When adjusting the tracking offset, always perform "6. Tracking balance adjustment." |
| **2** | **RF level adjustment** | | | | | |
| | | | TP1<br>Pin 1<br>(RF OUTPUT) | VR1<br>(Laser power) | 1.5Vp-p $^{+0.2V}_{-0V}$ | ● Put unit in the test mode. (※)<br>● Connect the oscilloscope to TP1 pin 1 (RF output), play the test disc, and measure the P-P voltage of the RF waveform.<br>● Adjust VR1 (Laser power) so that the voltage is 1.5Vp-p $^{+0.2V}_{-0V}$. |
| **3** | **LD (laser diode) power check** | | | | | |
| | | | | | Less than 0.13mW | ● Put unit in the test mode. (※)<br>● Press the TRACK FWD (▷▷\|) key to turn ON the laser diode (LD).<br>● Place the sensor of the optical power meter directly above the objective lens and confirm that the LD power is less than 0.13mW. |
| **4** | **Focus lock and spindle lock check** | | | | | |
| | 0.5V/div | 100msec/div | TP1<br>Pin 1<br>(RF output) | | RF signal is output.<br><br>Forward (clockwise) rotation | ● Set the test disc.<br>● Put unit in the test mode. (※)<br>● Press the REPEAT key to move the pickup to the center of the disc.<br>● Observe the output of TP1 pin 1 (RF output) on the oscilloscope. Confirm that the RF signal is output after the TRACK FWD (▷▷\|) key is pressed.<br>● Press the PLAY (▷) key and confirm that the disc rotates at constant speed (approx. 300 rpm) near center of disc in the forward (clockwise) direction ; disc may not run away or rotate counterclockwise. |

※ : See page 38.

| Step No. | Oscilloscope Setting V | Oscilloscope Setting H | Test Points | Adjusting Points | Check items/ Adjustment specifications | Adjustment procedure |
|---|---|---|---|---|---|---|
| **5** | **Grating Adjustment (1) (When an 8 cm disc is used.)** | | | | | |
| | 0.5V/div | 5msec /div | TP1 Pin 2 (TRK. ERR) | Grating adjustment screw<br><br>Grating adjustment screw | Null point<br><br>Maximum amplitude | |

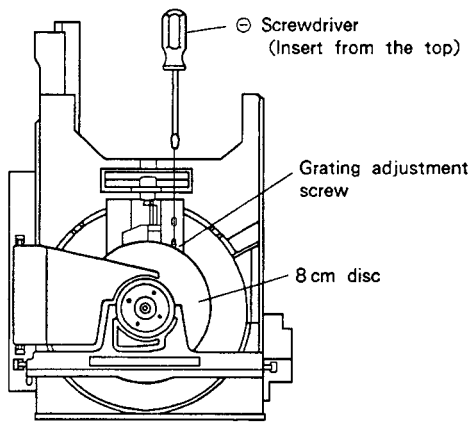



Fig. 8-2

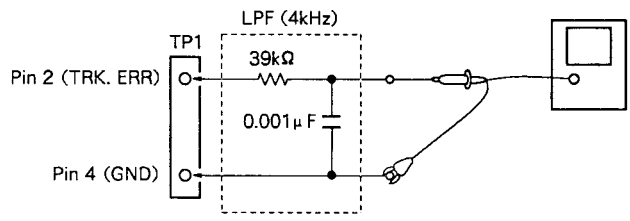



Fig. 8-3

Note : This adjustment can be made by using an 8 cm disc, having pits within the diameter range of 75 mm.

- Put unit in the test mode. (※)
- Load the 8 cm disc, move the pickup to the outer periphery so that the pickup grating adjustment hole is visible from the pit surface of the disc or from the hole in the servo mechanism (see Fig. 8-2).
- Press the TRACK FWD key (▷▷|) and PLAY key (▷) in sequence to close the focus servo and spindle servo (do not turn on the tracking servo).
- Insert a 4kHz-cutoff low pass filter between the oscilloscope and TP1 pins 2 (TRK. ERR) and 4 (GND) as shown in Fig. 8-3 and observe the waveform of TP1 pin 2 (tracking error) on the oscilloscope.

- Insert a ⊖ screwdriver into the grating hole, turn and find the null point (see Photo 8-1).
- Next, slowly turn the ⊖ screwdriver COUNTER-CLOCKWISE from the null point and adjust until the waveform (tracking error signal) reaches maximum amplitude (see Photo 8-2).

Note : Use caution since inserting the ⊖ screwdriver forcefully will cause the pickup unit to float upward.

- Lastly, make sure that there is no major fluctuation in the p-p voltage of the tracking error signal (do not insert the cutoff 4 kHz low-pass filter) when the pickup is moved to the inner and outer periphery. If there is a difference of more than ±10% again turn the grating adjustment screw and adjust the tracking error signal to maximum.

※ : See page 38.

| Step No. | Oscilloscope Setting V | Oscilloscope Setting H | Test Points | Adjusting Points | Check items/ Adjustment specifications | Adjustment procedure |
|---|---|---|---|---|---|---|
| 5' | **Grating adjustment (2) (When no 8 cm disc is available.)** | | | | | |

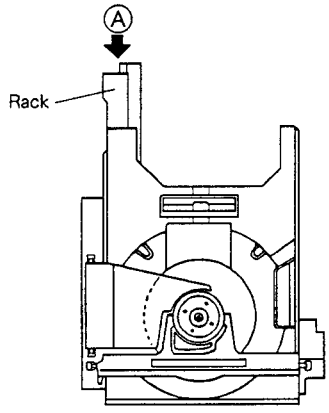



Fig. 8-4

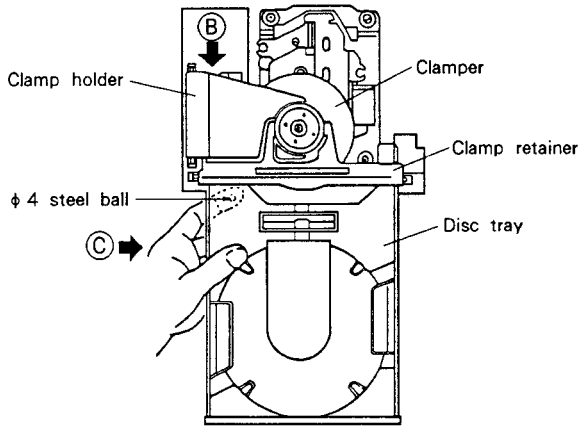



Fig. 8-5

This adjustment is made if no 8 cm disc is available and the grating adjustment (1) cannot be effectuated. Remove the disc tray to perform this adjustment.

● Removal of the disc tray

1. Press the rear edge of the rack, (∗1) marked Ⓐ in Fig. 8-4, while pulling the disc tray out to the position where it catches, illustrated in Fig. 8-5.

(∗1) When the rear edge of rack Ⓐ is pressed, first the disc clamp is released. If you continue pressing after it has been released completely, the disc tray is ejected.

2. While pulling the clamp holder Ⓑ(see Fig. 8-5) upward with the right hand, hold the tray as indicated by Ⓒ in the left hand and pull it outward. Take care not to allow the ϕ 4 steel ball to fall (we recommend holding the ball in place with the left index finger while extracting the tray.)

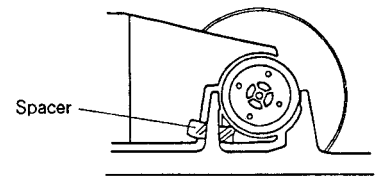



Fig. 8-6

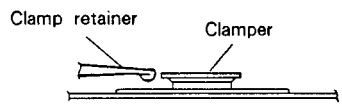



Fig. 8-7

| Step No. | Oscilloscope Setting V | Oscilloscope Setting H | Test Points | Adjusting Points | Check items/ Adjustment specifications | Adjustment procedure |
|---|---|---|---|---|---|---|
| | | | | | | ● Put unit in the test mode. (※)<br>● Press the REPEAT key to move the pickup to the vicinity of what would be the center of the disc. Position the pick up so its grating adjusting screw is visible through the elongated hole on the spindle motor side of the servo mechanism base plate.<br>● As shown in Fig. 8-8, insert a (slotted) ⊖ screwdriver from the rear of the mechanism and check that the grating adjusting screw can be rotated.<br>● Mount the test disc ; be sure to insert a 3-5 mm spacer (if no spacer is available, use a hex wrench) between the clamp holder and clamp retainer, as shown in Fig. 8-6.<br>● Confirm that the clamper and the clamp retainer are not contacting one another (Fig. 8-7).<br>● Press the TRACK FWD (▷▷\|) and the PLAY (▷) keys sequentially to close the focus and spindle servos (do not close the tracking servo).<br>● Insert a 4 kHz-cutoff low pass filter between the oscilloscope and TP1 pins 2 (TRK. ERR) and 4 (GND) as shown in Fig. 8-9 and observe the waveform of TP1 pin 2 (tracking error) on the oscilloscope. |
| | 0.5V/div | 5msec /div | TP1 Pin 2 (TRK. ERR) | Grating adjustment screw<br>Grating adjustment screw | Null point<br>Maximum amplitude | ● Turn the grating adjusting screw with the ⊖ screwdriver to find the null point (see Photo 8-1.).<br>● Next, slowly turn the ⊖ screwdriver COUNTER-CLOCKWISE and adjust to the point where the waveform (tracking error signal) first achieves its maximum amplitude (see Photo 8-2).<br><br>Note : Avoid applying pressure to the ⊖ screwdriver while adjusting the screw. Doing so causes the pickup to move inward, making adjustment more difficult.<br><br>● Lastly, remove the low pass filter and confirm that the tracking error signal (do not insert the cutoff 4 kHz low-pass filter) p-p voltage does not greatly vary when the pickup is moved to the inner-most and outer-most tracks of the disc.<br>If the levels diverge by ±10 % or more, re-adjust the maximum error amplitude point by turn the grating adjusting screw. |

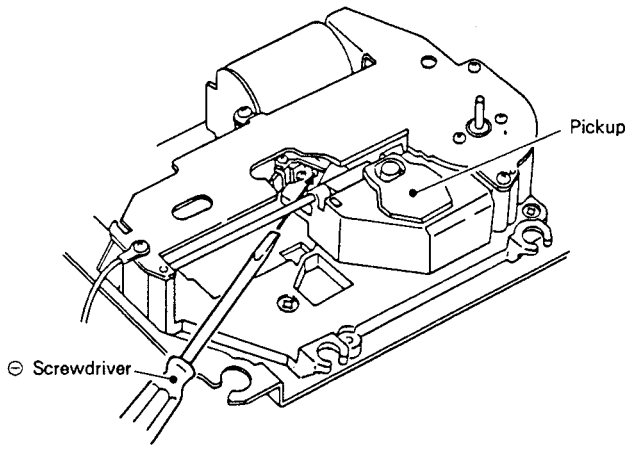



Fig. 8-8

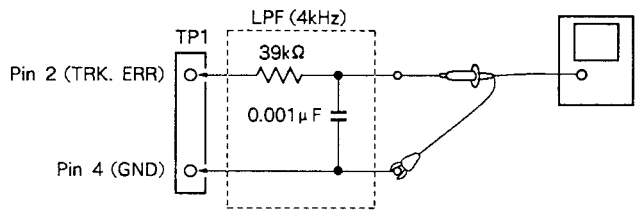



Fig. 8-9

※ : See page 38.

| Step No. | Oscilloscope Setting V | Oscilloscope Setting H | Test Points | Adjusting Points | Check items/ Adjustment specifications | Adjustment procedure |
|---|---|---|---|---|---|---|

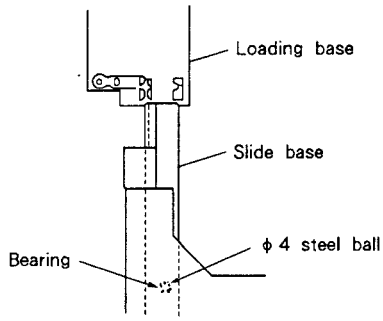



Fig. 8-10

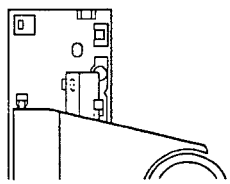


Fig. 8-11

Re-mount the disc tray according to the following procedure when the grating adjustment is complete.

1. Remove the disc and the spacer.
2. While lifting the clamp holder [marked Ⓑ in Fig. 8-5] with the right hand, hold the tray in the left hand as indicated by Ⓒ and slide the slide base into the hard resin fittings on the loading base as shown in Fig. 8-10 to re-insert the disc tray.
   At this time, be sure to hold the steel ball in place with the index finger of the left hand. Also, be careful that the front panel is not damaged by the slide base and bearing of the steel ball's bearing (in the slide base) coming into contact with the panel.
3. Insert the slide base so that it fits into the two hard resin fittings at the rear of the loading base (see Fig. 8-11).
4. Insert the tray tightly.

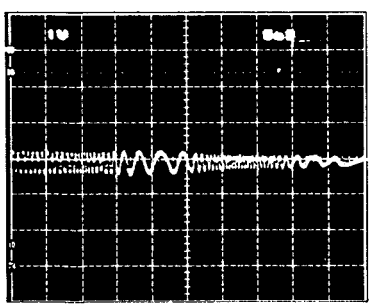


Photo 8-1
Null point

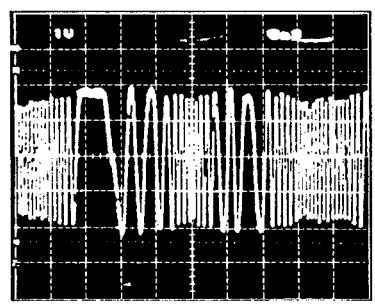


Photo 8-2
Maximum amplitude

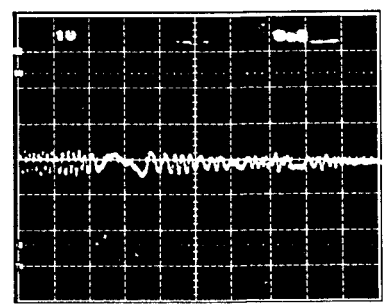
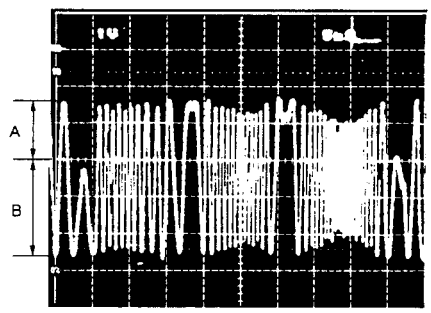


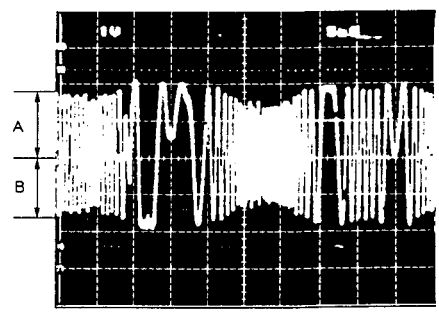
Photo 8-3
This is not the null-point waveform.

| Step No. | Oscilloscope Setting V | Oscilloscope Setting H | Test Points | Adjusting Points | Check items/ Adjustment specifications | Adjustment procedure |
|---|---|---|---|---|---|---|
| **6** | **Tracking balance adjustment** | | | | | |
| | 0.5V/div | 5msec /div | TP1 Pin 2 (TRK. ERR) | VR5 (TRK. BAL) | | ● Load the test disc.<br>● Put unit in the test mode. (※)<br>● Press the REPEAT key to position the pickup near the center of the disc.<br>● Press the TRACK FWD (▷▷\|) and PLAY (▷) keys sequentially to cause the disc to rotate.<br>● Observe TP1 pin 2 TRK. ERR (tracking error) on the oscilloscope and adjust VR5 TRK. BAL (tracking balance) to eliminate the DC elements from the tracking error signal. |
| **7** | **Tangential adjustment** | | | | | |



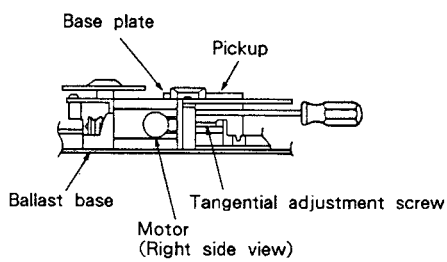

A ≠ B

Photo 8-4 DC elements mixed in signal




A = B

Photo 8-5 DC elements eliminated



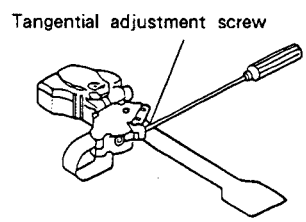




Fig. 8-12

- Put unit in the test mode. (※)
- Open the tray and load the test disc.
- Press the REPEAT key to position the pickup near the center of the disc.
- Insert a hex wrench into the tangential adjust-ment screw section from the rear of the mechanism.
- Close the tray.

Note: Do not use an L-shaped hex wrench. Use one such as shown to the left. Using an L-shaped hex wrench can cause the tray to come loose (see page 42 5'. Grating adjustment (2)).

- Press the TRACK FWD (▷▷|), PLAY (▷), and PAUSE (▯▯) keys sequentially to close the all servos (PLAY indicator will illuminate).

※ : See page 38.

| Step No. | Oscilloscope Setting V | Oscilloscope Setting H | Test Points | Adjusting Points | Check items/ Adjustment specifications | Adjustment procedure |
|---|---|---|---|---|---|---|
| | | 200nsec /div | TP1 Pin 1 RF output | Tangential adjustment screw | Sharpest possible eye pattern | ● Observe TP1 pin 1 (RF output) on the oscillo-scope and adjust the tangential adjustment screw to achieve the sharpest possible eye pattern.<br>● The point to which the adjusting screw should be set lies about halfway between the points at which the eye pattern becomes most blurred when the screw is rotated clockwise and counterclockwise. When the whole waveform becomes clear, concentrate on sharpening the fine lines forming the diamond at the center of the eye pattern (see Photo 8-8). Adjust until the fine lines on all four sides of the diamond are both sharply defined and dense, as shown in Photo 8-6.<br><br>Note : Use a hex wrench to raise the pickup some what while making this adjustment. |

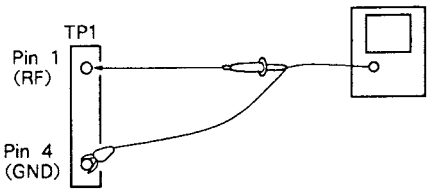



Fig. 8-13

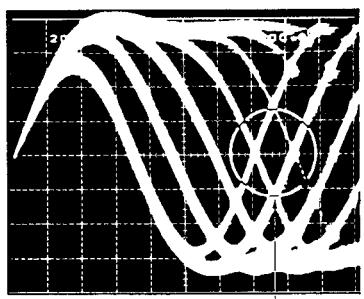



Photo 8-6

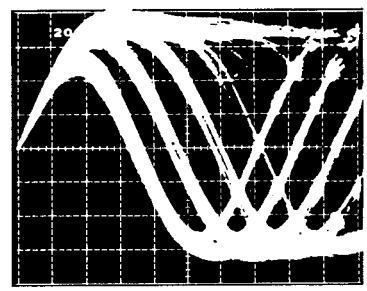


Photo 8-7

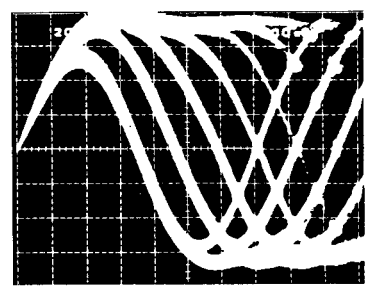


Photo 8-8

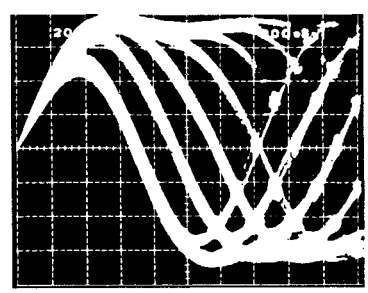


Photo 8-9

| Step No. | Oscilloscope Setting V | Oscilloscope Setting H | Test Points | Adjusting Points | Check items/ Adjustment specifications | Adjustment procedure |
|---|---|---|---|---|---|---|
| **8** | **Focus gain adjustment** | | | | | |
| | 20mV/div CH1 (X) 5mV/div CH2 (Y) (prove 10 : 1) | X-axis : TP1 Pin 5 (FCS. IN) Y-axis : TP1 Pin 6 (FCS. ERR) | VR3 (FCS. GAN) | Phase difference of 90° | | ● In the POWER OFF state, connect the oscillo-scope and oscillator as shown in Fig. 8-14.<br>● Set the unit to the normal PLAY mode.<br>● Turn ON the power to the oscillator and set it to output a 1.2kHz 1Vp-p signal.<br><br>Note : Some oscillators discharge a DC voltage when turned on. It is therefore recommended that the oscillator be connected after it has been turned on.<br><br>● Adjust VR3 FCS. GAN (focus gain) so that the Lissajous's figure becomes a horizontal circle (phase difference of 90°) (Phot 8-11) |

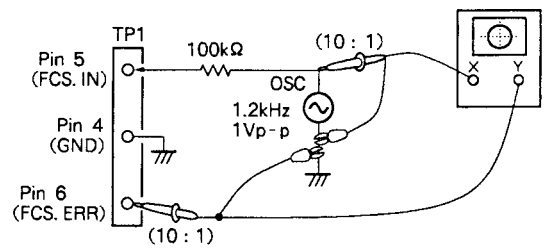



Fig. 8-14

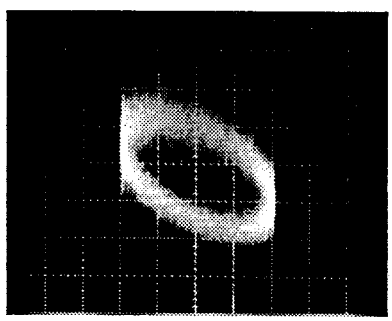


Photo 8-10
Gain overcompensated

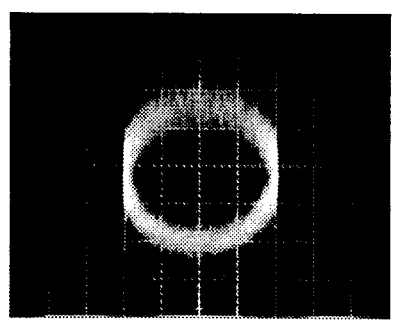


Photo 8-11
Gain optimum

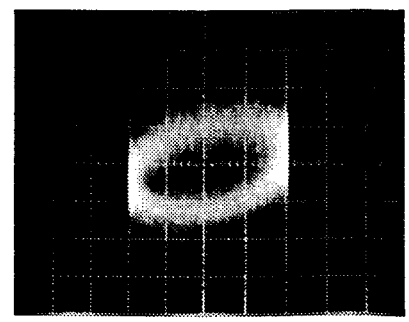


Photo 8-12
Gain undercompensated

| Step No. | Oscilloscope Setting V | Oscilloscope Setting H | Test Points | Adjusting Points | Check items/ Adjustment specifications | Adjustment procedure |
|---|---|---|---|---|---|---|
| **9** | **Tracking gain adjustment** | | | | | |
| | 50mV/div CH1 (X) 5mV/div CH2 (Y) (prove 10 : 1) | X-axis : TP1 Pin 3 (TRK. IN) Y-axis : TP1 Pin 2 (TRK. ERR) | VR4 (TRK. GAN) | Phase difference of 90° | | ● In the POWER OFF state, connect the oscillo-scope and oscillator as shown in Fig. 8-15.<br>● Set the unit to the normal PLAY mode.<br>● Turn ON the power to the oscillator and set it to output a 1.2kHz 2Vp-p signal.<br>Note : Some oscillators discharge a DC voltage when turned on. It is therefore recommended that the oscillator be connected after it has been turned on.<br>● Adjust VR4 TRK. GAN (tracking gain) so that the Lissajous's figure becomes a horizontal circle (phase difference of 90°). (Photo 8-14) |

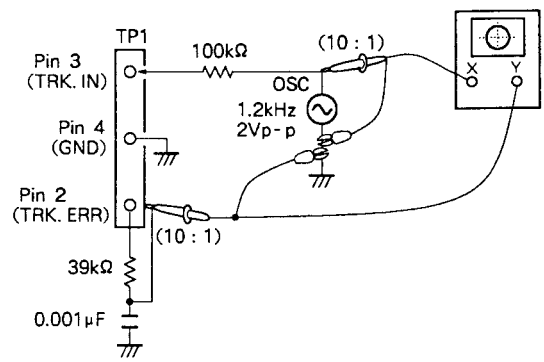



Fig. 8-15

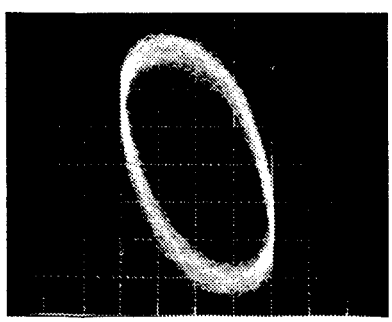


Photo 8-13
Gain overcompensated

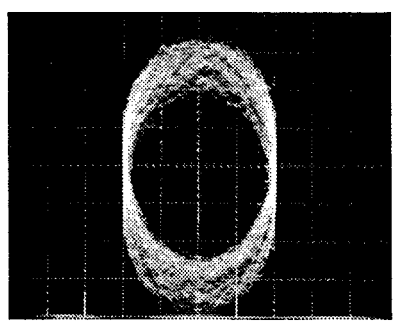


Photo 8-14
Gain optimum

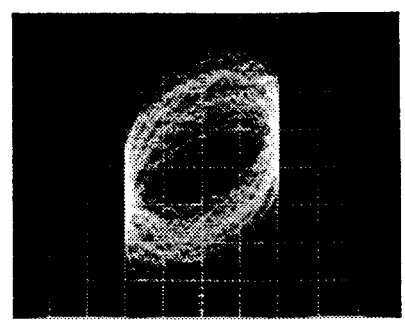
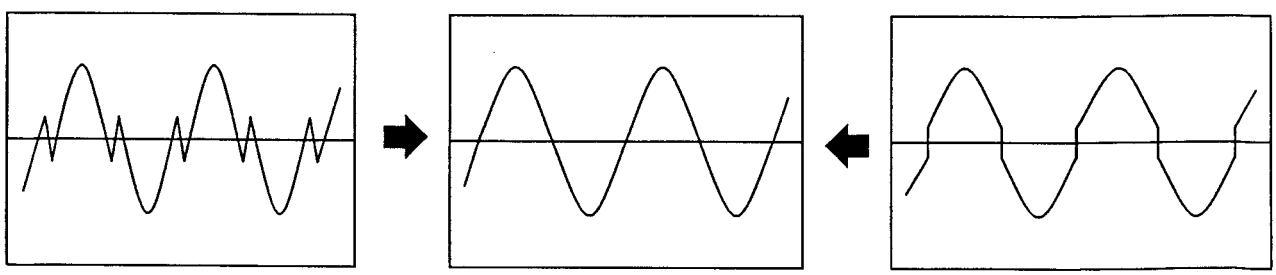


Photo 8-15
Gain undercompensated

| Step No. | Oscilloscope Setting V | Oscilloscope Setting H | Test Points | Adjusting Points | Check items/ Adjustment specifications | Adjustment procedure |
|---|---|---|---|---|---|---|
| **10** | **VCO free-run frequency adjustment** | | | | | |
| | | | TP2<br>Pin 2<br>(PLCK) | VR8<br>(VCO. ADJ) | 4.275 ± 0.025MHz | ● Put unit in the test mode. (※)<br>● Short the ASY and GND jumper with a ⊖ screwdriver or similar tool. (※)<br>● Connect a frequency counter capable of measuring frequencies of 10MHz and above to TP2 pin 2 (PLCK).<br>● Adjust VR8 (VCO adjustment) so that the frequency counter reading becomes 4.275 ± 0.025MHz. |
| **11** | **Method for checking S character (focus error)** | | | | | |
| | | | TP1<br>Pin 6<br>(FCS. ERR) | | | ● Put unit in the test mode. (※)<br>● Ground TP1 pin 5 FCS. IN (focus in) to GND.<br>● Observe the waveform output by TP1 pin 6 FCS. ERR (focus error) when the TRACK FWD (▷▷\|) key is pressed. |
| **12** | **MSB adjustment** | | | | | |
| | 5mV/div | 0.2msec / div | JA1<br>LINE OUTPUT<br>terminal<br>(L CH) | VR9 | Sine wave | ● Set the unit to the normal PLAY mode.<br>● Playback the track 20 (− 60 dB, 1kHz, Lch, Rch) of the test disc (YEDS-7). Connect the oscilloscope to the Lch of the LINE OUTPUT terminal (JA1), and observe the audio output waveform.<br>● Adjust VR9 MSB (L ch) so that the sine wave is obtained on the oscilloscope. |
| | | | JA1<br>LINE OUTPUT<br>terminal<br>(R CH) | VR10 | Sine wave | ● Adjust VR10 (R ch) in the same way. |

**● ZERO cross distortion waveform**



NG　　OK　　NG

※ : See page 38.

## 8.2 TUNER SECTION ADJUSTMENT

- Adjustment point are as shown in Fig. 8-18.

### 8.2.1 FM tuner section

- Make the wire connections as shown in Fig. 8-16.
- Press the BAND key to set FM mode.

| Step No. | FM SG (1kHz, ± 75kHz dev.) | | FD – J7 Reception Frequency Display | Adjustment | |
|---|---|---|---|---|---|
| | Frequency (MHz) | Level (dBμ) | | Adjustment Location | Specification |
| 1 | 98.0 | 60 | 98.0MHz | L705 | Adjust so that the voltage between REF and TM terminals in the TUNR unit becomes 0V ± 100mV. |
| 2 | 98.0 | 60 | 98.0MHz | — | Confirm that the level of TX-L (CN272-1) and TX-R (CN272-3) are − 1.5dBV $^{+2.0}_{-4.0}$dB. |
| 3 | 98.0 | 32 | 98.0MHz | — | Confirm that the distortion factor of TX-L (CN272-1) is within 3%. |
| 4 | 98.0 | 60 (No modulation) | 98.0MHz | VR701 | Adjust the frequency of VCO terminal in the TUNR unit to 76kHz ± 200Hz. (＊2) |
| 5 | 98.0 | 60 (＊1) | 98.0MHz | — | Confirm that the distortion factors of TX-L (CN272-1) and TX-R (CN272-3) are less than 1.5%. |
| 6 | 98.0 | 60 (＊1) | 98.0MHz | — | Confirm that the separations of TX-L (CN272-1) and TX-R (CN272-3) are more than 27dB. |
| 7 | 98.0 | Variable (＊1) | 98.0MHz | — | Confirm that the TUNED and STEREO indicators lights up and go out when the FM SG level is gradually increased. |
| 8 | 98.0 | 60 (＊1) | 98.0MHz | — | Press the MODE switch on the front panel and confirm that the mode becomes monaural. |

(＊1) Stereo Modulation : Main 1kHz L + R • ± 68.25kHz dev
Pilot 19kHz ± 6.75kHz dev.
(＊2) Adjust at 76.2KHz ± 300Hz when it is within 2 minutes after power-on.

### 8.2.2 AM tuner section

- For the KU type, perform only steps 4 through 6 for confirmation.
- Make the wire connections as shown in Fig. 8-17.
- Press the BAND key to set AM mode.
- For the HEI and HB types, perform the adjustment in steps 1 through 7.

| Step No. | AM SG (400Hz. 30% modulation) | | FD – J7 Reception Frequency Display | Adjustment | |
|---|---|---|---|---|---|
| | Frequency (kHz) | Level (dBμ) | | Adjustment Location | Specification |
| 1 | 603 | 30 | 603kHz | Ⓐ side of MW block TC701 | Adjust the voltage of SM terminal to the maximum. |
| | 1395 | | 1395kHz | | |
| 2 | Repeat step 1 until voltage becomes the maximum. | | | | |
| 3 | 603 | 30 | 603kHz | F702 | Adjust the voltage of SM terminal to the maximum. |
| 4 | (1000 : KU only) 999 | Variable | (1000kHz : KU only) 999kHz | — | Confirm that the TUNED indicator lights up and goes out when the AM SG level is gradually increased. |
| 5 | (1000 : KU only) 999 | 74 | (1000kHz : KU only) 999kHz | — | Confirm that the levels of TX-L (CN272-1) and TX-R (CN272-3) are − 14.5dBV ± 4dB. |
| 6 | (1000 : KU only) 999 | Variable | (1000kHz : KU only) 999kHz | — | Confirm that the antenna input level of − 10dB of the rated output becomes more than 22dBμV. |
| 7 | 164 | 74 | 164kHz | — | Confirm that the frequencies of both the 164kHz and 254kHz can be received. |
| | 254 | | 254kHz | | |

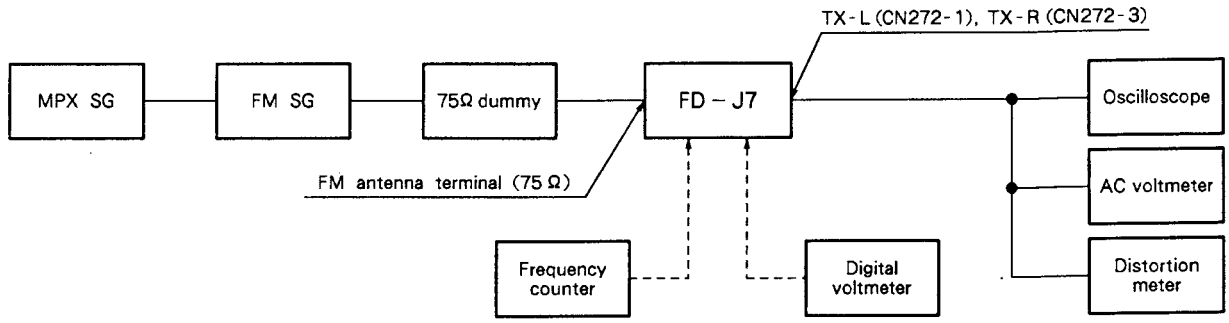



Fig. 8-16 FM adjustment connection diagram

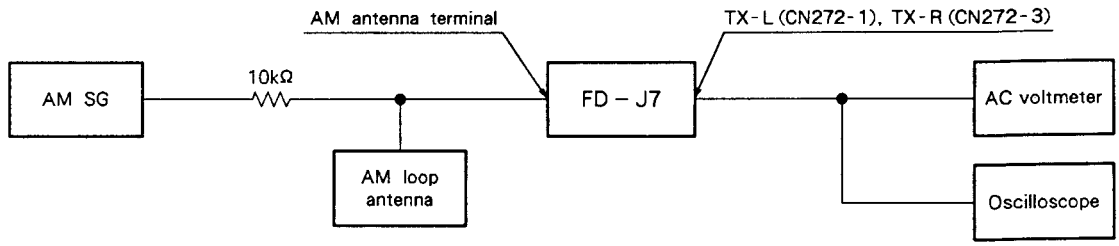



Fig. 8-17 AM adjustment connection diagram

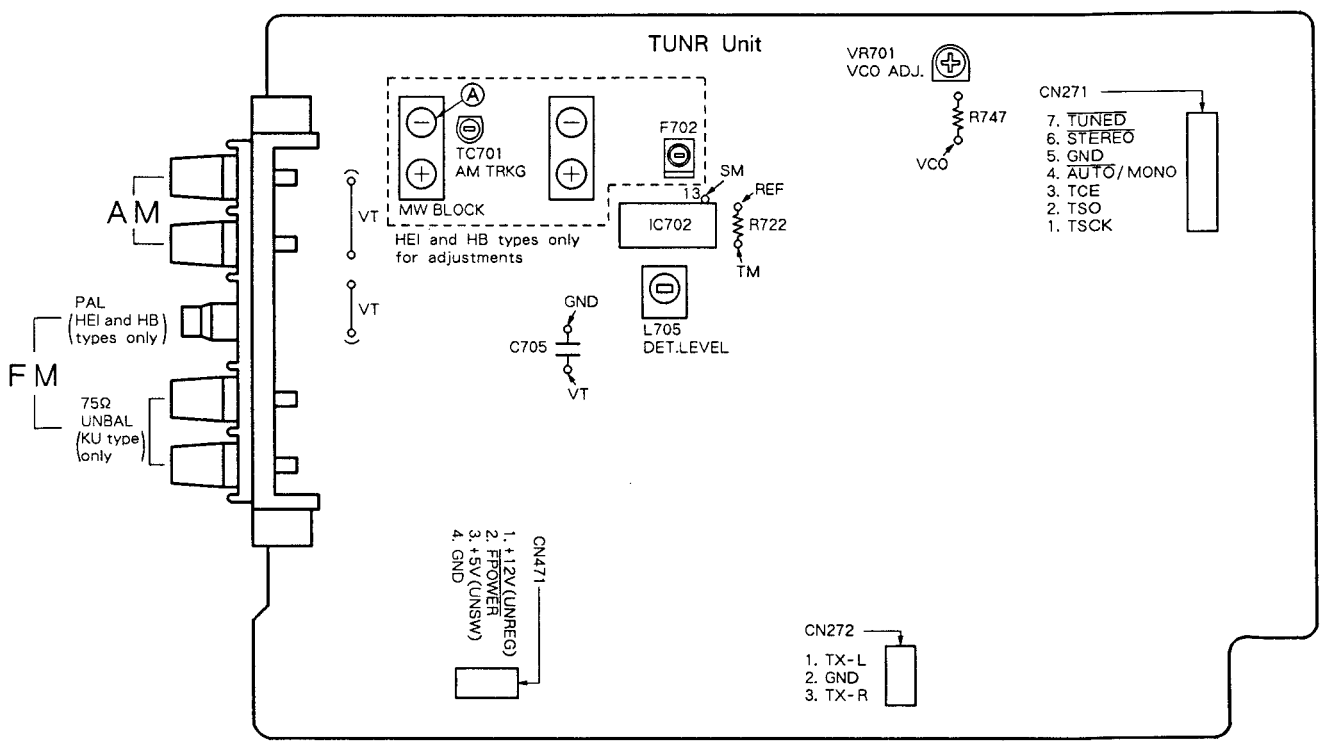



Fig. 8-18 Adjustment points

# 8. RÉGLAGES

## 8.1 RÉGLAGE DU SECTION CD

On trouvera ci-après les réglages requis pour cet appareil. Ils doivent être exécutés dans l'ordre donné.

### ● Réglages et items de vérification

1. Réglage de compensation, de mise au point et RF.
2. Réglage du niveau RF
3. Vérification d'alimentation de diode laser (LD).
4. Vérification de verrouillage de mise au point et de verrouillage d'axe
5. Réglage du grincement
6. Réglage d'équilibre d'alignement
7. Réglage tangentiel
8. Réglage de gain de mise au point
9. Réglage de gain d'alignement
10. Réglage de fréquence libre VCO
11. Méthode de confirmation du caractère S (erreur de mise au point)
12. Réglage de MSB

### ● Matériel de mesure

1. Oscilloscope cathodique à deux faisceaux.
2. Wattmètre optique
3. Disque d'essai (YEDS-7), disque de 8 cm
4. Filtre d'ajustement de gain de boucle
5. Générateur de signal
6. Fréquencemètre
7. Tournevis, pinces, fer à souder, etc.

### ● Apropos du mode d'essai

Il y a deux façons d'entrer le mode d'essai CD comme indiqué ci-dessous.

① Dans le mode STANDBY, enfoncer l'interrupteur S501 (POWER) en appuyant sur l'interrupteur de mode d'essai (S1) pour mettre l'appareil sous tension.

② Dans le mode tuner, enfoncer la touche □ (STOP) en appuyant sur l'interrupteur de mode d'essai (S1).

Pour rêlacher le mode d'essai CD, appuyer soit sur la touche BAND, soit sur l'interrupteur POWER (S501). (OFF)

Dans le mode d'essai, chaque touche fonctionne comme indiqué dans le tableau 8-1, et l'indication "TEST" est affichée.

### ● Dispositifs d'ajustement et no menclature

VR1 : Puissance laser
VR2 : Décalage RF (RF. OFS)
VR3 : Gain de mise au point (FCS. GAN)
VR4 : Gain d'alignement (TRK. GAN)
VR5 : Equilibrage d'alignement (TRK. BAL)
VR6 : Décalage de mise au point (FCS. OFS)
VR7 : Décalage d'alignement (TRK. OFS)
VR8 : Ajustement VCO (VCO. ADJ)
VR9 : Ajustement MSB (Canal gauche)
VR10 : Ajustement MSB (Canal droit)

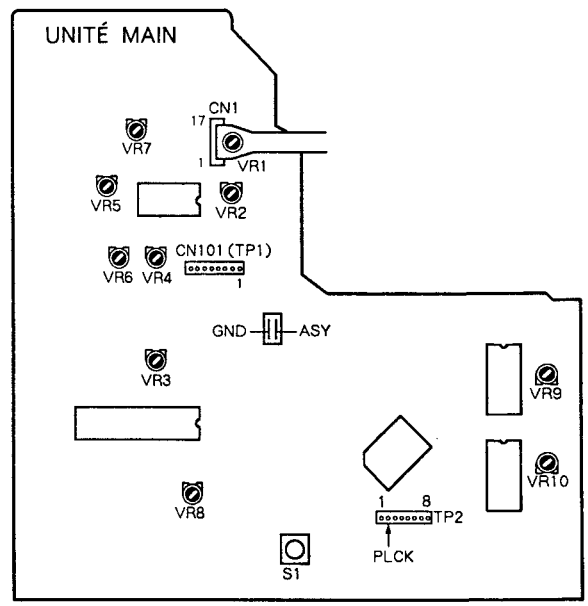
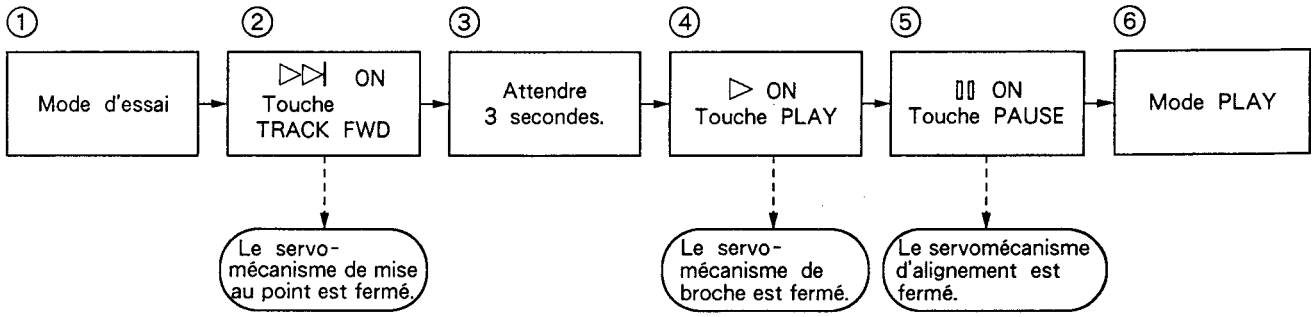



Fig. 8-1 Points de réglage

En mode d'essai, les servos doivent être fermés et ouverts individuellement. En conséquence, les servos doivent chacun être fermés dans la séquence correcte (séquence sérielle) afin de placer l'appareil en mode de lecture. Remarquer également que l'appareil ne se placera pas en mode de lecture par une poussée sur la touche PAUSE (▯▯).

Par exemple, pour passer du mode d'arrêt au mode de lecture, les touches de fonction doivent être actionnée dans l'ordre suivant.

* En mode d'essai, les servos doivent être opérés en séquence sérielle.




## • Fonctions des touches en mode d'essai

| Symbole | Nom de touche | Fonction en mode d'essai | Description |
|---|---|---|---|
| ▷▷| | TRACK FWD | Servo de mise au point fermé | Allume la diode laser et élève ou abaisse l'actuateur de mise au point pour fermer le servo de mise au point. |
| ▷ | PLAY | Servo d'axe fermé | Ferme le servo en mode CLV-A après cognement du moteur d'axe. |
| ▯▯ | PAUSE | Fermture/ouverture de servo d'alignement | Agit comme interrupteur articulé: ferme le servo d'alignement et active le mode de lecture quand poussé (pourvu que les servos de mise au point et d'alignement soient fermés), auquel moment le témoin PLAY s'allume ; ouvre le servo d'alignement à la poussée suivante. |
| RANDOM *1 | RANDOM PLAY | Inversion du chariot (déplacement vers l'intérieur) | Déplace rapidement (3 cm/sec) le chariot vers la plage la plus au centre. Prendre garde à ne pas déplacer trop loin car il n' existe pas de dispositif de sécurité pour arrêter le chariot. |
| REPEAT *2 | REPEAT | Avance du chariot (déplacement vers l'extérieur) | Déplace repidement (3 cm/sec) le chariot vers la plage la plus à l'extérieur. Prendre garde à ne pas déplacer trop loin car il n'existe pas de dispositif de sécurité pour arrêter le chariot. |
| □ | STOP | STOP | Arrête tous les servos et ramène le système à l'état initial. Cependant, le capteur ne revient pas à la position de repos à STOP. |
| ⏏ | OPEN/CLOSE | Ouverture/fermeture du plateau de disque | Ouvre et ferme le plateau du disque. Cependant, le capteur ne revient pas à la position de repos à OPEN et il reste stationnaire à CLOSE. |

*1 : Cet appareil utilise la touche "RANDOM" et la télécommande utilise les touches "◁◁ MANUAL SEARCH REV" et "RANDOM".

*2 : Cet appareil utilise la touche "REPEAT" et la télécommande utilise les touche "▷▷ MANUAL SEARCH FWD" et "REPEAT".

Tableau 8-1

| N° de étape | Réglage d'oscilloscope V | Réglage d'oscilloscope H | Points d'essai | Points de réglage | Postes de contrôle / Spécifications de réglage | Procédure de réglage |
|---|---|---|---|---|---|---|
| **1** | **Réglage de compensation, de mise au point et RF.** | | | | | |
| | | | TP1<br>Broche 2<br>(TRK. ERR) | VR5<br>(TRK. BAL) | Décalage d'alignement 45° | ● Placer l'appareil en mode d'essai. (※)<br>● Régler VR5 TRK. BAL (équilibrage d'alignement) à la position environ à 45° à la gauche du centre. |
| | | | | VR7<br>(TRK. OFS) | 0V ± 50mV | ● Régler VR7 TRK. OFS (décalage d'alignement) de sorte que la tension TRK. ERR (erreur d'alignement) à TP1 broche 2 devienne 0V ± 50mV. |
| | | | TP1<br>Broche 6<br>(FCS. ERR) | VR6<br>(FCS. OFS) | Décalage de mise au point 0V ± 50mV | ● Régler VR6 FCS. OFS (décalage de mise au point) de sorte que la tension FCS. ERR (erreur de mise au point) à TP1 broche 6 devienne 0V ± 50mV. |
| | | | TP1<br>Broche 1<br>(RF OUTPUT) | VR2<br>(RF. OFS) | Décalage RF 100mV ± 50mV | ● Régler VR2 RF. OFS (décalage RF) de sorte que la tension de sortie RF à TP1 broche 1 devienne 100mV ± 50mV.<br><br>Remarque : Lors de l'ajustement de la compensation, effectuer toujours "6. "Réglage d'équilibre d'alignement". |
| **2** | **Réglage du niveau RF** | | | | | |
| | | | TP1<br>Broche 1<br>(RF OUTPUT) | VR1<br>(Puissance laser) | 1,5Vc-c $^{+0,2V}_{-0V}$ | ● Placer l'appareil en mode d'essai. (※)<br>● Raccorder l'oscilloscope à TP1 broche 1 (sortie RF), reproduire le disque d'essai et mesurer la tension P-P de la forme d'onde RF.<br>● Régler VR1 (puissance laser) de façon que la tension soit de 1,5Vc-c $^{+0,2V}_{-0V}$. |
| **3** | **Vérification d'alimentation de diode laser (LD)** | | | | | |
| | | | | | Moins de 0,13mW | ● Placer l'appareil en mode d'essai. (※)<br>● Appuyer sur les touches TRACK FWD (▷▷\|) pour allumer la diode laser (LD).<br>● Placer le puissance-mètre optique directement sur la lentille et vérifier que la puissance de la diode laser (LD) est inférieure à 0,13mW. |
| **4** | **Vérification de verrouillage de mise au point et de verrouillage d'axe** | | | | | |
| | 0,5V/div | 100msec /div | TP1<br>Broche 1<br>(sortie RF) | | Le signal RF est fourni.<br><br>Rotation avant (Sens des aiguilles) | ● Installer le disque d'essai.<br>● Placer l'appareil en mode d'essai. (※)<br>● Appuyer sur la touche REPEAT pour amener le capteur au centre du disque.<br>● Observer la sortie de TP1 broche 1 (sortie RF) sur l'oscilloscope. Confirmer que le signal haute fréquence est fourni après que la touche TRACK FWD (▷▷\|) est actionnée.<br>● Appuyer sur la touche PLAY (▷) et confirmer que le disque tourne à vitesse constante (env. 300 tr/mn près du centre du disque) dnas le sens avant (sens des aiquilles). Il peut arriver que le disque ne tourne pas ou tourne dans le sens contraire des aiguilles. |

※ : Voir page 52.

| N° de étape | Réglage d'oscilloscope V | Réglage d'oscilloscope H | Points d'essai | Points de réglage | Postes de contrôle / Spécifications de réglage | Procédure de réglage |
|---|---|---|---|---|---|---|
| 5 | **Réglage du grincement (1) (Lorsqu'un disque de 8 cm est utilisé.)** | | | | | |

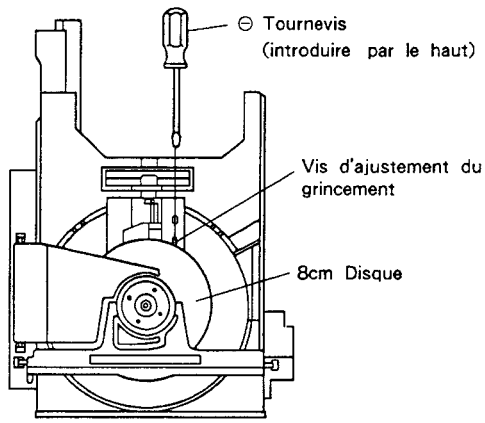



Fig. 8-2

| | | | | |
|---|---|---|---|---|
| 0,5V/div | 5msec /div | TP1 Broche 2 (TRK. ERR) | Vis d'ajustement de grincement | Point nul |
| | | | Vis d'ajustement de grincement | Amplitude maximale |

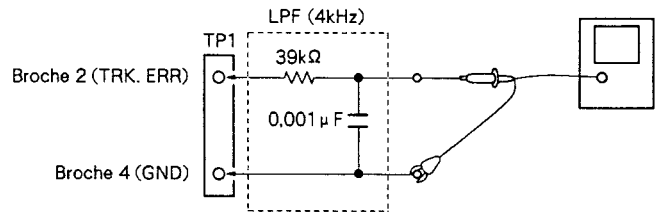



Fig. 8-3

Remarque : Ce réglage peut être effectué en utilisant un disque de 8 cm, dont les cavités se trouvent dans un diamètre de 75 mm.

- Régler l'appareil en mode d'essai. (※)
- Installer le 8 cm disque d'essai, amener le capteur à la périphérie extérieure de sorte que l'orifice d'ajustement du grincement soit visible de la surface du disque ou par l'orifice du servomécanisme (voir Fig. 8-2).
- Appuyer sur la touche TRACK FWD (▷▷|) et PLAY (▷) en séquence pour allumer le servo de mise au point et le servo d'axe (ne pas tourner le servo d'alignement).
- Installer un filtre passe-bas de coupure à 4kHz entre l'oscilloscope et TP1 broche 2 (TRK. ERR) et 4 (GND) comme illustré sur la Fig. 8-3 et ovserver la forme d'onde de TP1 broche 3 (erreur d'alignement) sur l'oscilloscope.)

- Insérer un ⊖ tournevis dans l'orifice du grincement, le tourner et rechercher le point nul (voir Photo 8-1).
- Tourner ensuite lentement le ⊖ tournevis DANS LE SENS CONTRAIRE DES AIGUILLES à partir du point nul jusqu'à ce que la forme d'onde (signal d'erreur d'alignement) atteigne l'amplitude maximale (voir Photo 8-2).

Remarque : Agir avec précaution car une insertion forcée du ⊖ tournevis provoquera un flottement du capteur vers l'intérieur.

- Finalement, confirmer qu'il n'y a pas de fluctuation importante dans la tension c-c du signal d'erreur d'alignement (ne pas insérer le filtre passe-bas 4 kHz) quand le capterur est déplacé vers la périphérie intérieure et vers la périphérie extérieure. Si l'on constate une différence supérieure à 10% tourner à nouveau la grincement et regler le signal d'erreur d'alignement au maximum.

※ : Voir page 52.

| N° de étape | Réglage d'oscilloscope V | Réglage d'oscilloscope H | Points d'essai | Points de réglage | Postes de contrôle / Spécifications de réglage | Procédure de réglage |
|---|---|---|---|---|---|---|
| 5' | **Réglage du grincement (2) (Lorsqu'aucun disque de 8 cm n'est disponible.)** | | | | | |

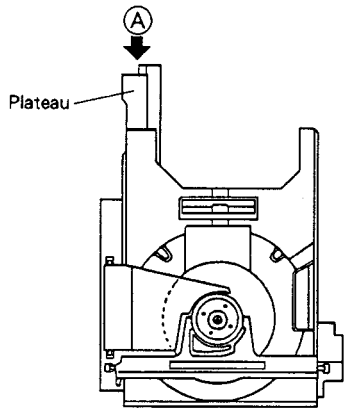



Fig. 8-4

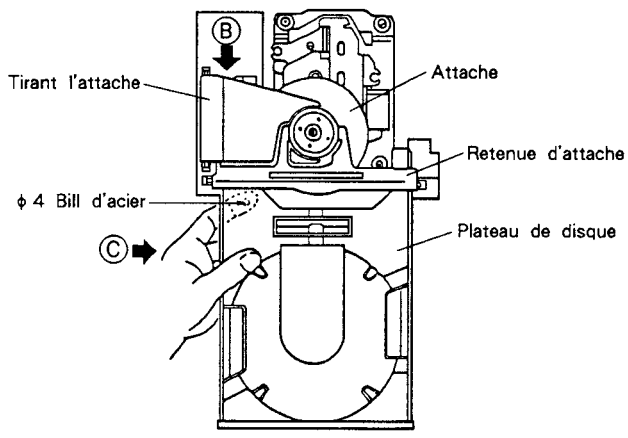



Fig. 8-5

Ce réglage est effectué si aucun disque de 8 cm n'est disponible et que le réglage du grincement (1) ne peut être effectué. Retirer le plateau du disque pour procéder à ce réglage.

● Retrait du plateau du disque

1. Pousser sur le bord arrière à lendroit marquè Ⓐ sur la Fig. 8-4, (*1) tout en retirant le plateau du disque vers la position oú il tient, comme illustré sur la Fig. 8-5.

(*1) Lorsqu'on appuie à l'arriér de la crémaillère Ⓐ, le dispositif de maintien du disque est déverrouillé. Une pression prolongée au-delà de l'ouverture complète éjecte le tiroir du disque.

2. Tout en tirant l'attache Ⓑ (voir Fig. 8-5) vers le haut de la main droite, tenir le plateau comme indiqué par Ⓒ de la main gauche et tirer vers l'extérieur. Prendre garde à ne pas laisser tomber les bills d'acier. Il est conseillé de maintenir la bille en place par l'index gauche tout en extrayant le plateau.

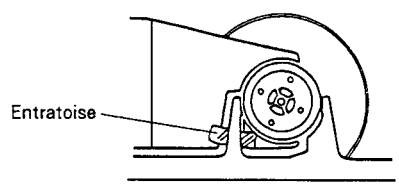



Fig. 8-6

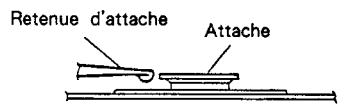
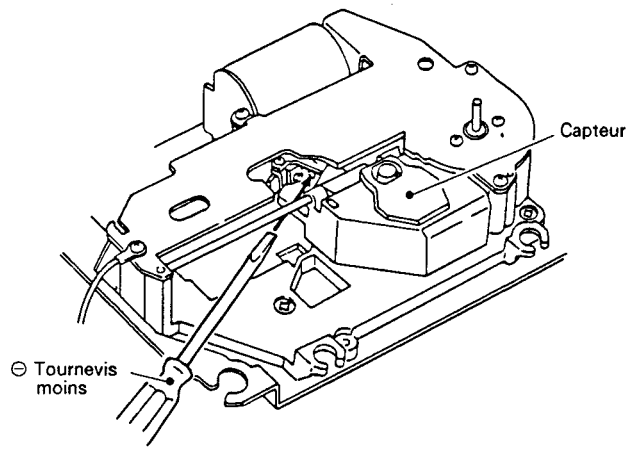
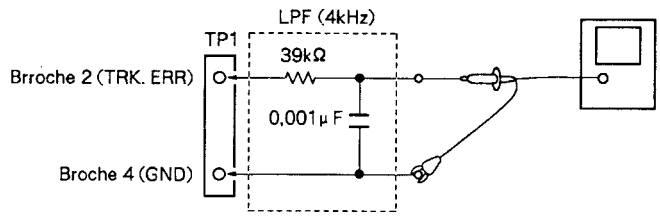



Fig. 8-7

| N° de étape | Réglage d'oscilloscope V | Réglage d'oscilloscope H | Points d'essai | Points de réglage | Postes de contrôle / Spécifications de réglage | Procédure de réglage |
|---|---|---|---|---|---|---|
| |  Fig. 8-8  Fig. 8-9 | | | | | ● Placer l'appareil en mode d'essai. (※)<br>● Appuyer sur la touche REPEAT pour amener le capteur près de l'endroit qui devrait être le centre du disque. Positionner le capteur de sorte de sa vile de réglage de grille soit visble par l'orifice allongé sur le côté du moteur d'axe de la plaque de base sur servomécanisme.<br>● Comme illustré sur la Fig. 8-8, introduire un ⊖ tournevis (moins) par l'arrière du mécanisme de sorte que la vis de réglage de grincement puisse être tournée.<br>● Installer le disque d'essai ; veiller à insérer une entretoise de 3 – 5 mm (si aucune entretoise n'est disponible, se servir d'une clé hexagonale) entre l'attache et la retenue d'attache illustré sur la Fig. 8-6.<br>● Confirmer que l'attache et la retenue ne fasse pas contact l'une sur l'autre (Fig. 8-7).<br>● Appuyer sur les touches TRACK FWD (▷▷\|) et PLAY (▷) en séquence pour fermer les servos de mise au point et d'axe (ne pas fermer le servo d'alignement).<br>● Installer un filtre passe-bas de coupure à 4 kHz entre l'oscilloscope et TP1 broche 2 (TRK. ERR) et 4 (GND) comme illustré sur la Fig. 8-9 et observer la forme d'onde de TP1 broche 3 (erreur d'alignement) sur l'oscilloscope. |
| | 0,5V/div | 5msec /div | TP1 Broche 2 (TRK. ERR) | Vis d'ajustement de grincement<br><br>Vis d'ajustement de grincement | Point nul<br><br>Amplitude maximale | ● Tourner la vis d'ajustement de grincement à l'aide du ⊖ tournevis pour tuouver le point nul (voir Photo 8-1).<br>● Tourner ensuite lentement la ⊖ tournevis DANS LE SENS CONTRAIRE DES AIGUILLES du point nul et régler au point où la forme d'onde (signal d'erreur d'alignement) arrive à son amplitude maximale (voir Photo 8-2).<br><br>Remarque : Eviter d'appuyer sur le ⊖ tournevis pendant le réglage de la vis, car ceci dépacerait le capteur vers l'intérieur, rendant l'ajustement plus difficile.<br><br>● En dernier lieu, retirer le filtre passe-bas et confirmer que la tension p-p du signal d'erreur d'alignement (ne pas insérer le filtre passe-bas 4 kHz) ne varie par fortement quand le capteur est déplacé à la première et à la dernière plage du disque. Si les neveaux divergent de 10% ou davantage, ré-ajuster le point d'amplitude d'erreur maximale en tournant sur la vis d'ajustement. |

※ : Voir page 52.

| N° de étape | Réglage d'oscilloscope V | Réglage d'oscilloscope H | Points d'essai | Points de réglage | Postes de contrôle / Spécifications de réglage | Procédure de réglage |
|---|---|---|---|---|---|---|
| | | | | | | Remonter le plateau du disque selon la procédure ci-après après avoir terminé l'ajustement de grincement.<br>1. Retirer le disque et l'entretoise.<br>2. Tout en levant l'attache (marquée par Ⓑ sur la Fig. 8-5) de la main droite, tenir le plateau de la main droite comme illustré par Ⓒ et déplacer la base coulissante dans les armatures en résine dure sur la base de chargement, comme indiqué sur la Fig. 8-10 pour ré-insérer le plateau du disque.<br>A ce moment, prendre soin de tenir la bille d'acier en place par l'index de la main droite. Veiller également que le panneau avant ne soit pas endommagé par le roulement (dans la base coulissante), entrant en contact avec le panneau.<br>3. Insérer la base coulissante de sorte qu'elle s'engage dans les armatures en résine dure à l'arrière de la base de cahrgement (voir Fig. 8-11).<br>4. Insére à ferme le plateau. |

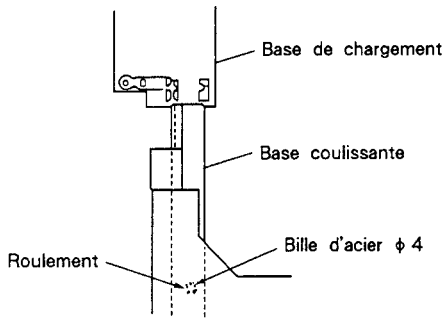



Fig. 8-10

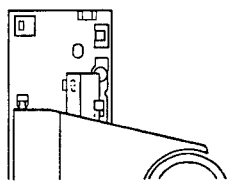


Fig. 8-11

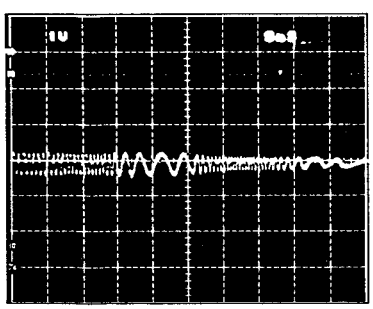


Photo 8-1
Point nul

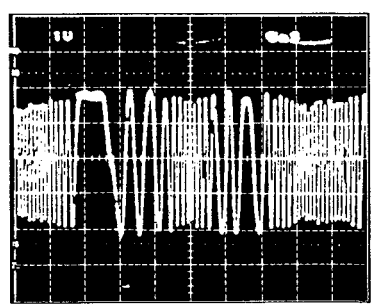


Photo 8-2
Amplitude maximale

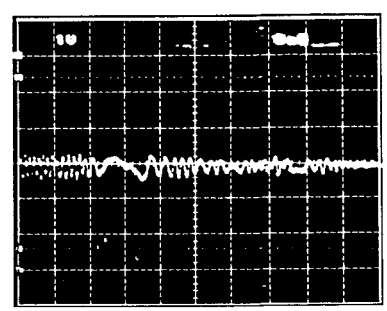
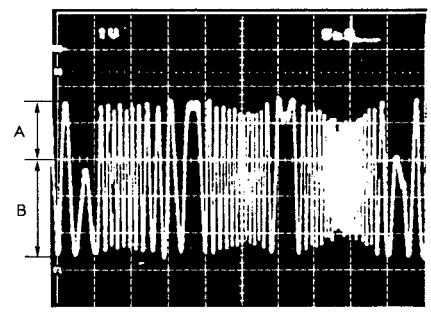


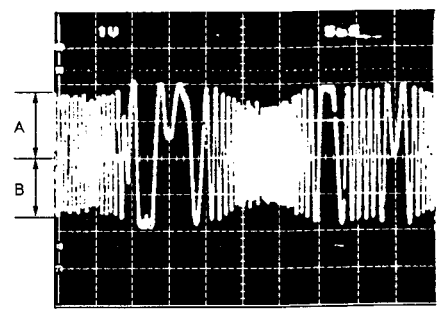
Photo 8-3
Ceci n'est pas la forme d'onde du point nul

| N° de étape | Réglage d'oscilloscope V | Réglage d'oscilloscope H | Points d'essai | Points de réglage | Postes de contrôle / Spécifications de réglage | Procédure de réglage |
|---|---|---|---|---|---|---|
| **6** | **Réglage d'équilibre d'alignement** | | | | | |
| | 0,5V/div | 5msec / div | TP1 Broche 2 (TRK. ERR) | VR5 (TRK. BAL) | | ● Installer le disque d'essai.<br>● Régler l'appareil en mode d'essai. (※)<br>● Appuyer sur la touche REPEAT pour amener le capteur prés du centre du disque.<br>● Appuyer sur les touches TRACK FWD (▷▷I) et PLAY (▷) en séquence pour faire tourner le disque.<br>● Observer TP1 broche 2 TRK.ERR (erreur d'alignement) sur l'oscilloscope et regler VR5 TRK . BAL (équilibrage d'alignement ) pour éliminer les éléments CC du signal d'erreur d'alignement. |
| **7** | **Réglage tangentiel** | | | | | |



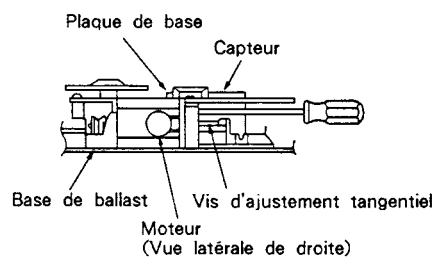

A ≠ B

Photo 8-4 Eléments CC mêlés au signal




A = B

Photo 8-5 Eléments CC éliminés



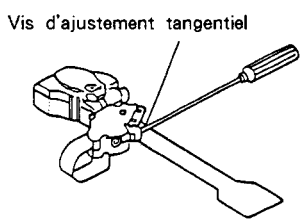




Fig. 8-12

- Régler l'appareil en mode d'essai. (※)
- Ouvrir le plateau et installer le disque d'essai.
- Appuyer sur la touche REPEAT pour amener le capteur vers le centre du disque.
- Insérer une clé hexagonale par l'orifice de la vis d'ajustement tangentiel par l'arrière du mécanisme.
- Refermer le plateau.

Remarque : Ne pas se servir d'une clé hexagonale en L, mais une comme illustré sur la gauche. L'emploi d'une clé hexagonale en L pourrait relâcher le plateau [voir page 56 5'. Réglage du grincement (2).]

- Appuyer sur les touches TRACK FWD (▷▷I) et PLAY (▷) en séquence pour fermer les servos (le témoin PLAY s'allume).

※ : Voir page 52.

| N° de étape | Réglage d'oscilloscope V | Réglage d'oscilloscope H | Points d'essai | Points de réglage | Postes de contrôle / Spécifications de réglage | Procédure de réglage |
|---|---|---|---|---|---|---|
| | | 200nsec / div | TP1 Broche 1 Sortie RF | Vis d'ajustement tangentiel | Mire la plus nette possible | ● Observer TP1 broche 1 (sortie RF) sur l'oscilloscope et agir sur la vis d'ajustement tangentiel pour obtenir la mire la plus nette possible.<br>● Le point où la vis d'ajustement doit être amenée se trouve environ à mi-course entre les points où la mire est la plus floue guand la vis est tournée à fond dans le sens des aiguilles et dans le sens contraire. Quand toute la forme d'onde devient claire, se concentrer sur la netteté des lignes fines, formant un losange au centre de la mire (voir Photo 8-8). Régler jusqu'à ce que les lignes fines s8r les quatre côtés du losange soient bien définies et denses, comme illustré sur la Photo 8-6.<br><br>Remarque : Se servir d'une clé hexagonale pour lever légérement le capteur pendant cet ajustement. |

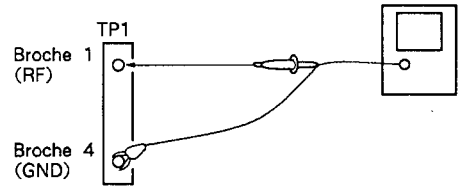



Fig. 8-13

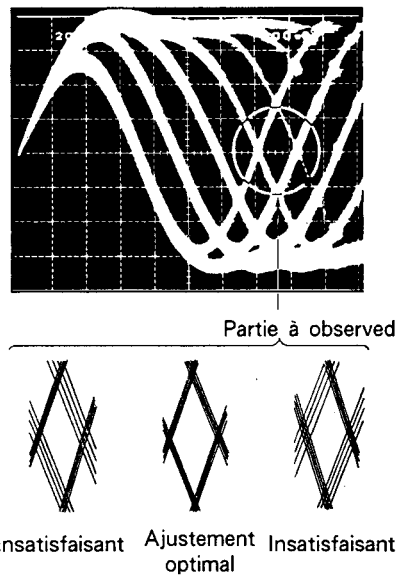
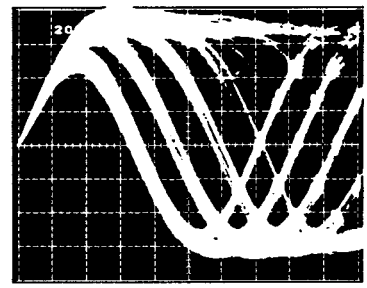



Photo 8-6



Phtot 8-7

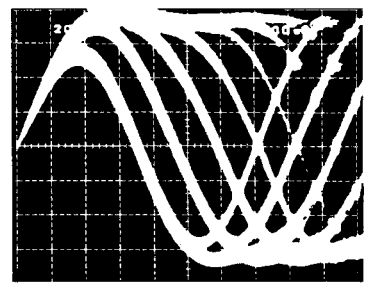


Photo 8-8

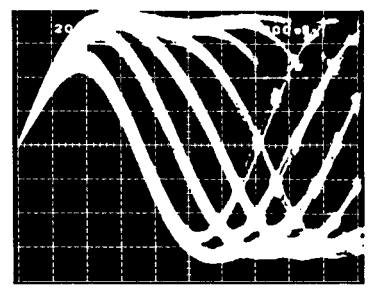


Photo 8-9

| N° de étape | Réglage d'oscilloscope V | Réglage d'oscilloscope H | Points d'essai | Points de réglage | Postes de contrôle / Spécifications de réglage | Procédure de réglage |
|---|---|---|---|---|---|---|
| **8** | **Réglage de gain de mise au point** | | | | | |
| | | | | | | ● L'alimentation étant coupée (POWER OFF), raccorder l'oscillateur comme illustré sur la Fig. 8-14.<br>● Régler l'appareil en mode de lecture normale.<br>● Mettre l'oscillateur sous tension (ON) et le régler pour fournir un signal de 1,2kHz 1Vp-p.<br><br>Remarque : Certains oscillateurs déchargent une tension DC lors de leur mise sous tension. Par conséquent, il est conseillé de connecteur l'oscillateur aprés l'avoir mis sous tension. |
| | 20mV/div CH1 (X)<br>5mV/div CH2 (Y)<br>(sonde 10 : 1) | Axe des X : TP1 Broche 5 (FCS. IN)<br>Axe des Y : TP1 Broche 6 (FCS. ERR) | VR3 (FCS. GAN) | Différence de phase de 90° | | ● Ajust VR3 FCS. GAN (gain de mise au point) de sorte que la figure de Lissajou devienne un cercle horizontal (différence de phase de 90° ). (Photo 8-11) |

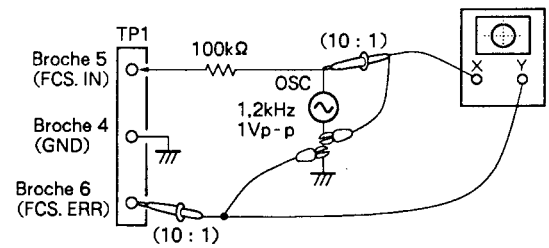



Fig. 8-14

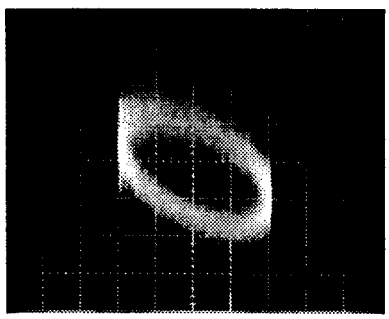


Photo 8-10
Gain sur-compensé

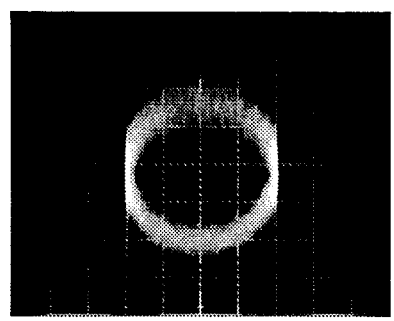


Photo 8-11
Gain optimal

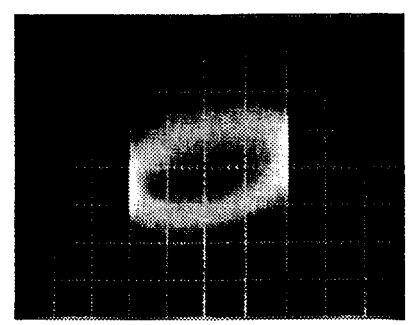


Photo 8-12
Gain sous-compensé

| N° de étape | Réglage d'oscilloscope V | Réglage d'oscilloscope H | Points d'essai | Points de réglage | Postes de contrôle / Spécifications de réglage | Procédure de réglage |
|---|---|---|---|---|---|---|
| **9** | **Réglage de gain d'alignement** | | | | | |
| | 50mV/div CH1 (X) 5mV/div CH2 (Y) (sonde 10 : 1) | | Axe des X : TP1 Broche 3 (TRK. IN) Axe des Y : TP1 Broche 2 (TRK. ERR) | VR3 (TRK. GAN) | Difference de phase de 90° | ● L'alimentation étant coupée (POWER OFF), raccorder l'oscillateur comme illustré sur la Fig. 8-15.<br>● Régler l'appareil en mode de lecture normale.<br>● Mettre l'oscillateur sous tension (ON) et le régler pour fournir un signal de 1,2kHz 2Vp-p.<br><br>Remarque : Certains oscillateurs déchargent une tension DC lors de leur mise sous tension. Par consequent, il est conseillé de connecter l'oscillateur aprés l'avoir mis sus tension.<br><br>● Ajuster VR4 TRK. GAN (gain d'alignement) de sorte que la figure de Lissajou devienne un cercle horizontal (différence de phase de 90° ) (Photo 8-14) |

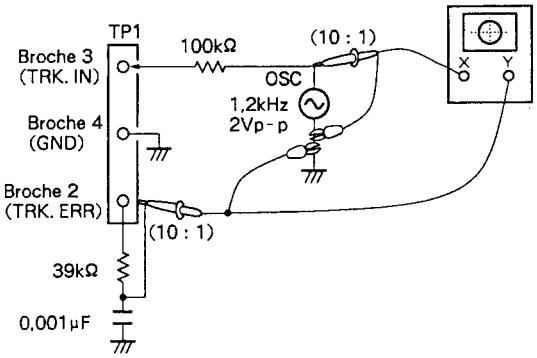



Fig. 8-15

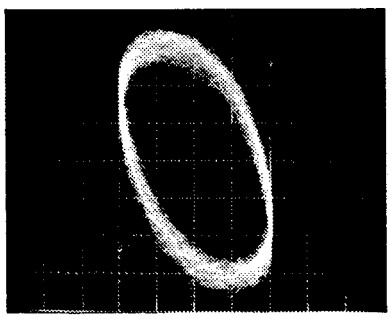


Photo 8-13
Gain sur-compensé

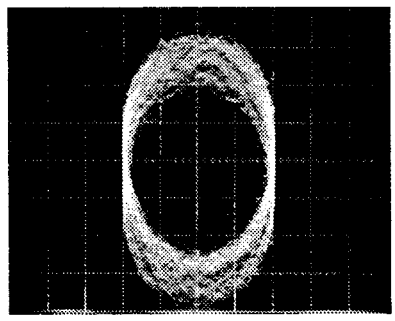


Photo 8-14
Gain optimal

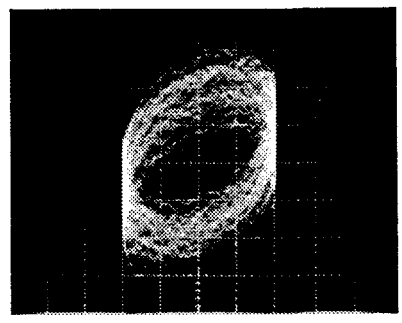
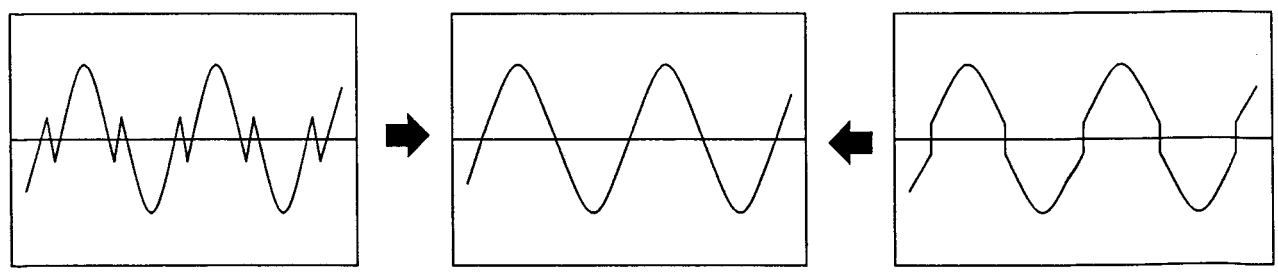


Photo 8-15
Gain sous-compensé

| N° de étape | Réglage d'oscilloscope V | Réglage d'oscilloscope H | Points d'essai | Points de réglage | Postes de contrôle / Spécifications de réglage | Procédure de réglage |
|---|---|---|---|---|---|---|
| **10** | **Réglage de fréquence libre VCO** | | | | | |
| | | | TP2<br>Broche 2<br>(PLCK) | VR8<br>(VCO. ADJ) | 4,275 ± 0,025MHz | ● Régler l'appareil en mode d'essai. (※)<br>● Court-circuiter l'ensemble et le cavalier de masse (GND) à l'aide d'un ⊖ tournevis ou d'un outil analogue. (※)<br>● Raccorder un fréquencemètre, capable de mesurer des fréquences de 10MHz et audelà, sur TP2 broche 2 (PLCK).<br>● Ajuster VR8 (ajustement VCO) de sorte que la lecture du fréquencemètre devienne 4,275 ± 0,025MHz. |
| **11** | **Méthode de confirmation du caractère S (erreur de mise au point)** | | | | | |
| | | | TP1<br>Broche 6<br>(FCS. ERR) | | | ● Régler l'appareil en mode d'essai. (※)<br>● Mettre TP1 broche 5 FCS. IN (gain de mise au point) à la masse (GND).<br>● Observer la sortie de forme d'onde à TP1 broche 6 FCS. ERR (erreur de mise au point) quand la TRACK FWD (▷▷\|) est actionnée. |
| **12** | **Réglage de MSB** | | | | | |
| | 5mV/div | 0.2msec / div | JA1<br>Borne<br>LINE OUTPUT<br>(canal gauche) | VR9 | Onde sinusoidale | ● Réglaer l'appareil en mode de lecture normale.<br>● Reproduire la piste 20 (−60dB, 1kHz, canal gauche, canal droit du disque d'essai YEDS-7). Raccorder l'oscilloscope au canal gauche de la borne LINE OUTPUT (JA1) et observer la forme d'onde de la sortie audio.<br>● Ajuster VR9 MSB (canal gauche) de sorte que l'onde sinusoidale apparaisse surr l'oscilloscope.<br>● Ajuster VR10 (canal droit) de la même manière. |
| | | | JA1<br>Borne<br>LINE OUTPUT<br>(canal droit) | VR10 | Onde sinusoidale | |

**● Forme d'onde de la distorsion de croisement zero**



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※ : Voir page 52.

## 8.2 RÉGLAGE DU SÉCTION TUNER

- Les emplacements du réglage sont illustrés à la Fig. 8-18.

### 8.2.1 Section du tuner FM

- Precéder aux connexions comme illustré à la Fig. 8-16.
- Presser la touche BAND pour régler sur le mode FM.

| Etape N° | FM SG (1kHz ± 75kHz déviat) | | FD – J7 affichage de fréquence de réception | Réglage | |
|---|---|---|---|---|---|
| | Fréquence (MHz) | Niveau (dBμ) | | Lieu de réglage | Caractéristiques |
| 1 | 98.0 | 60 | 98.0MHz | L705 | Régler de façon à ce que la tension entre les bornes REF et TM de l'unité TUNR est 0V ± 100mV. |
| 2 | 98.0 | 60 | 98.0MHz | — | Vérifier que les niveaux de TX-L (CN272-1) et TX-R (CN272-3) sont − 1.5dBV $^{+2.0}_{-4.0}$dB. |
| 3 | 98.0 | 32 | 98.0MHz | — | Vérifier que le facteur de distorsion de TX-L (CN272-1) est dans 3%. |
| 4 | 98.0 | 60 (Pas de modulation) | 98.0MHz | VR701 | Régler la fréquence de la borne VCO de l'unité TUNR sur 76kHz ± 200Hz. (＊2) |
| 5 | 98.0 | 60 (＊1) | 98.0MHz | — | Vérifier que les niveaux de TX-L (CN272-1) et TX-R (CN272-3) sont moins de 1,5%. |
| 6 | 98.0 | 60 (＊1) | 98.0MHz | — | Vérifier que les séparations de TX-L (CN272-1) et TX-R (CN272-3) sont plus de 27dB. |
| 7 | 98.0 | Variable (＊1) | 98.0MHz | — | Vérifier que les indicateurs TUNED et STEREO s'allument et s'éteignent quand le niveau FM SG est augmenté graduellement. |
| 8 | 98.0 | 60 (＊1) | 98.0MHz | — | Enfoncer l'interrupteur MODE sur le panneau avant et vérifier que le mode devient monaural. |

(＊1) Modulation stéréo : Principale 1kHz G + D • ± 68.25kHz de déviation
Pilote 19kHz ± 6.75kHz de déviation.
(＊2) Régler sur 76,2kHz ± 300Hz quand il est dans 2 minutes après que l'appareil est mis sous tension.

### 8.2.2 Section du tuner AM

- Pour le type KU, procéder le réglage des étapes 4 à 6 seulement pour la confirmation.
- Procéder aux connexions comme illustré à la Fig. 8-17.
- Presser la touche BAND pour régler sur le mode AM.
- Pour le types HEI et HB, procéder le réglage des étapes de 1 à 7.

| Etape N° | AM SG (400Hz, modulation 30%) | | FD – J7 affichage de fréquence de réception | Réglage | |
|---|---|---|---|---|---|
| | Fréquence (kHz) | Niveau (dBμ) | | Lieu de réglage | Caractéristiques |
| 1 | 603 | 30 | 603kHz | Ⓐ side of MW block TC701 | Régler la tension de la borne SM sur le maximum. |
| | 1395 | | 1395kHz | | |
| 2 | Répéter l'étape 1 jusqu'à ce que la tension devient le maximum. | | | | |
| 3 | 603 | 30 | 603kHz | F702 | Régler la tension de la borne SM sur le maximum. |
| 4 | (1000:Uniquement du KU) 999 | Variable | (1000kHz : Uniquement du KU) 999kHz | — | Vérifier que l'indicateur TUNED s'allume et s'éteint quand le niveau AM SG est augmenté graduellement. |
| 5 | (1000:Uniquement du KU) 999 | 74 | (1000kHz : Uniquement du KU) 999kHz | — | Vérifier que les niveaux de TX-L (CN272-1) et TX-R (CN272-3) sont − 14.5dBV ± 4dB. |
| 6 | (1000:Uniquement du KU) 999 | Variable | (1000kHz : Uniquement du KU) 999kHz | — | Vérifier que le niveau d'entrée d'antenne de − 10dB de la sortie nominale devient plus de 22dBμV. |
| 7 | 164 | 74 | 164kHz | — | Vérifier que les fréquences de 164kHz et 254kHz peuvent être reçues. |
| | 254 | | 254kHz | | |

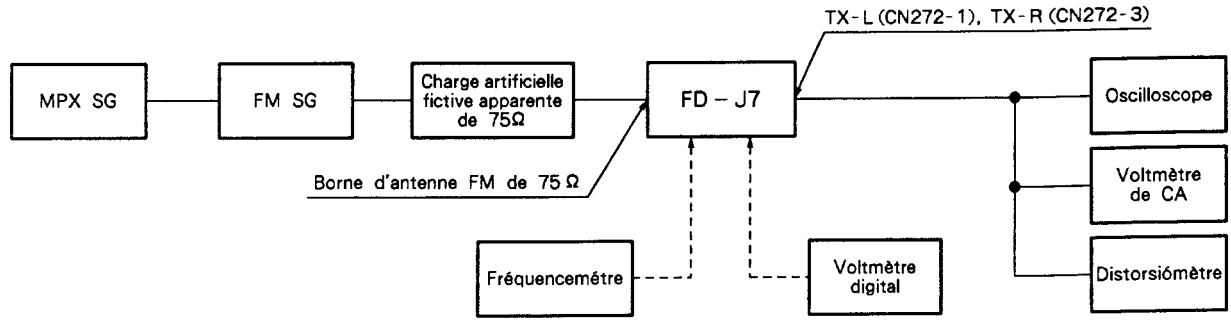



Fig. 8-16 Diagramme de connexions de réglage FM

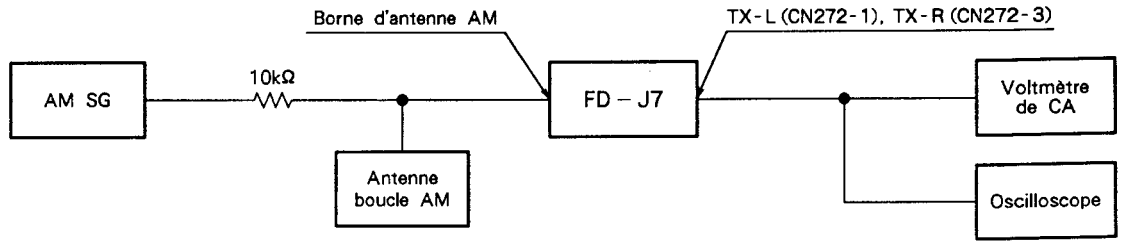



Fig. 8-17 Diagramme de connexions de réglage AM

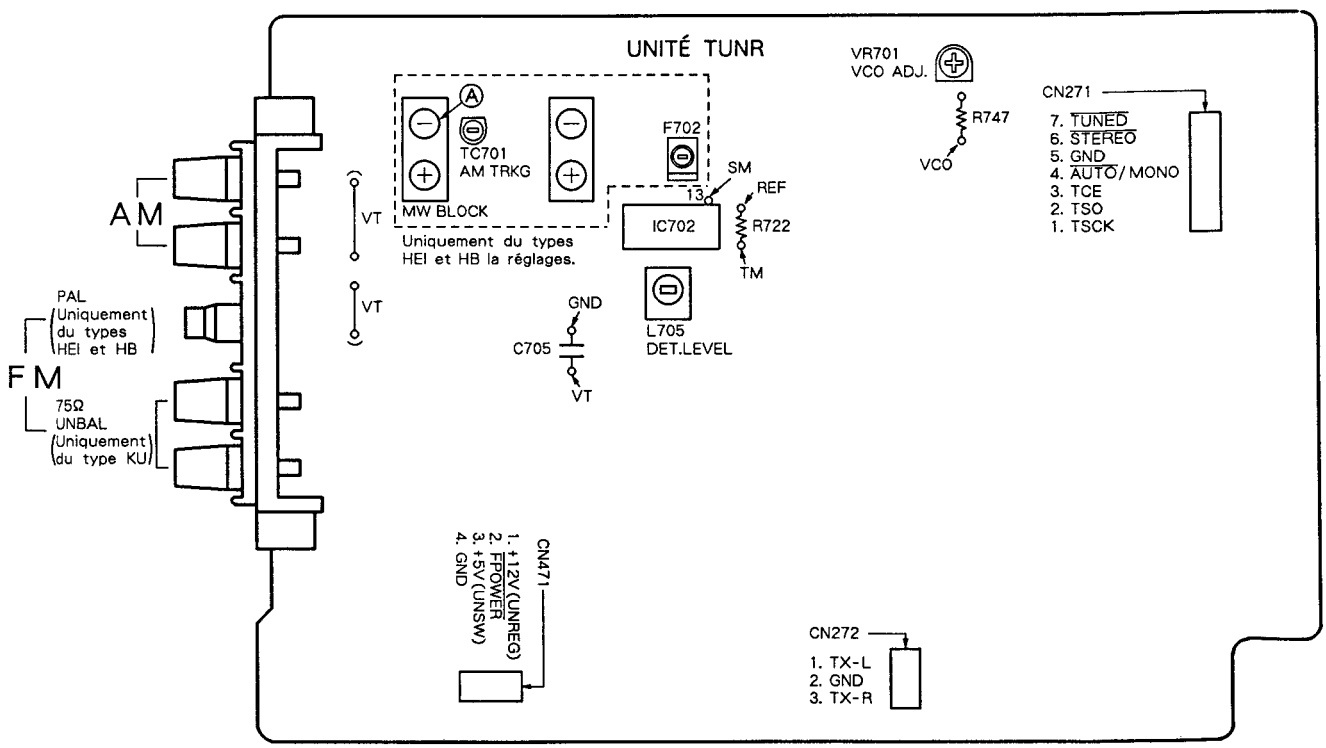



Fig. 8-18 Point de réglage

# 8. AJUSTES

## 8.1 AJUSTE DEL SECCIÓN DE CD

A continuación se of recen los ajustes para esta unidad. Estos ajustes deberán realizarse en el orden indicado.

### ● Ajustes e itemes de comprobación

1. Ajuste de la desviación de seguimiento, enfoque y RF.
2. Ajuste del nivel de RF
3. Comprobación de la energía del diodo laśer (LD)
4. Comprobación de la sincronización del enfoque y del eje
5. Ajuste de retícula
6. Ajuste del equilibrio de seguimiento
7. Ajuste tangencial
8. Ajuste de la ganancia de enfoque
9. Ajuste de la ganancia de seguimiento
10. Ajuste de la frecuencia de oscilación libre del oscilador controlade por tensión (VCO)
11. Método para confirmar el carácter S (error de enfoque)
12. Ajuste de MSB

### ● Equipos de medición

1. Osciloscopio de doble traza
2. Medidor de enería óptica
3. Disco de prueba (YEDS-7), disco de 8 cm
4. Filtro de ajuste de ganancia de bucle
5. Generador de seüales
6. Frecuencímetro
7. Otros equipos de medición regulares

### ● Modo de prueba

Hay siguientes dos maneras para introducir en el modo de prueba de CD.

① En el modo de CD, primero presione POWER SW (S501) para pasar al modo de espera (STADBY) y después presione S501 manteniendo presionado el interruptor de modo de prueba (S1) para conectar la alimentación.

② En el modo del sintonizador, presione la tecla □ STOP (parada) manteniendo presionado el interruptor de modo de prueba (S1).

Para desactivar el modo de prueba de CD, presione la tecla BAND o el interruptor POWER SW (S501). (OFF)

En el modo de prueba, cada tecla funcionará como se indica en la tabla 8-1, y se visualizará " TEST ".

### ● Tores variables (VR) de ajuste y sus nombres

VR1 : Alimentación de laśer
VR2 : Desviación de RF (RF. OFS)
VR3 : Ganancia de enfoque (FCS. GAN)
VR4 : Ganancia de seguimiento (TRK. GAN)
VR5 : Equilibrio de seguimiento (TRK. BAL)
VR6 : Desviación de enfoque (FCS. OFS)
VR7 : Desviación de seguimiento (TRK. OFS)
VR8 : Ajuste del VCO (VCO. ADJ)
VR9 : Ajuste del MSB (canal derecho)
VR10 : Ajuste del MSB (canal izquierdo)

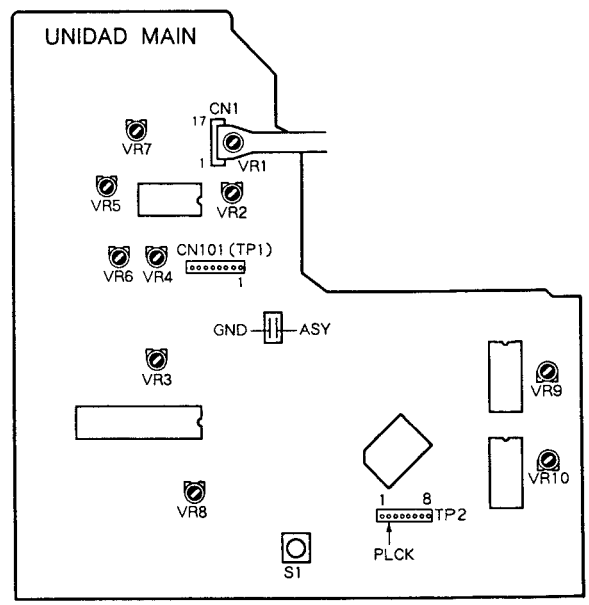
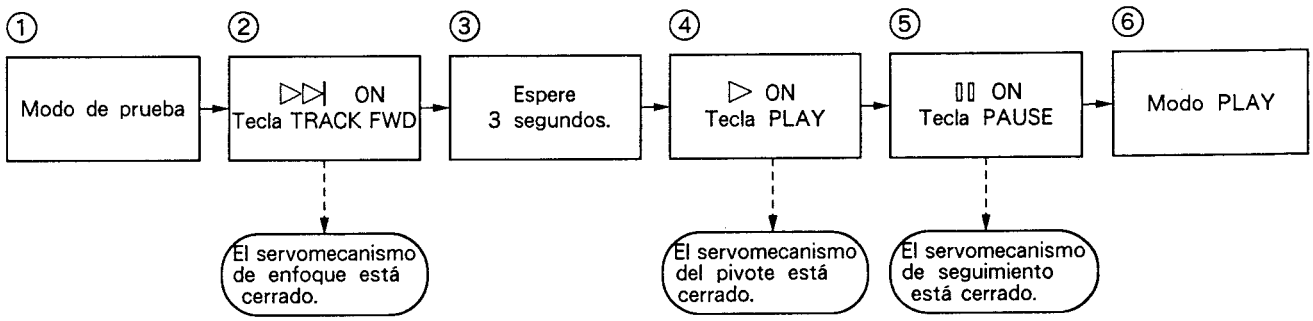



Fig. 8-1 Punto de ajuste

En el modo de prueba, los servos deberán abrir y cerrarse individualmente. Por consiguiente, los servos deberán cerrarse en la secuencia apropiada (secuencia en serie) a fin de poner la máquina en el modo de reproducción. Tenga en cuenta además que la máquina no entrará en el modo de reproducción cuando haya presionado la tecla PAUSE (▯▯).

Por ejemplo, para cambiar del modo de parada al de reproducción, tendrá que presionar las teclas de función en el orden siguiente :

* En el modo de prueba, los servos deberán operarse en secuencia en serie.




## • Funciónes de las teclas en el modo de prueba

| Símbolo | Nombre de la tecla | Función en el modo de prueba | Descripción |
|---|---|---|---|
| ▷▷\| | TRACK FWD | Cierre del servo de enfoque | Activa el diodo lasér, y eleva y hace descender el actuador de enfoque para cerrar el servo de enfoque. |
| ▷ | PLAY | Cierre del servo del eje | Cierra el servo en el modo CLV-A después de impulsar el motor del eje. |
| ▯▯ | PAUSE | Cierre/apertura del servo de seguimiento | Actúa como conmutador : cierra el servo de seguimiento y activa el modo de reproducción cuando se presiona (suponiendo que los servos de enfoque y del eje estén cerrados), momento en el que se encenderá el indicador PLAY ; y abre el servo de seguimiento cuando vuelve a presionarse. |
| RANDOM *1 | RANDOM PLAY | Retroceso del carro (se mueve hacia adentro) | Mueve el carro rápidamente (3 cm/s) hacia la pista más interior. Tenga cuidado para no moverlo demesiado ya que no hay dispositivo de seguridad para detener el carro. |
| REPEAT *2 | REPEAT | Avance del carro (mueve el carro hacia afuera) | Mueve el carro rápidamente (3 cm/s) hacia la pista más exterior. Tenga cuidado para no moverlo demasiado ya que no hay dispositivo de seguridad para detener el carro. |
| □ | STOP | Parada | Para todos los servos y devuelve el sistema a su estado inicial.<br>Sin embargo, el captor no regresa a su soporte en STOP. |
| ⏏ | OPEN/CLOSE | Apertura/cierre de la bandeja del disco | Abre cierra la bandeja del disco. Sin embargo, el captor no regresa a su soporte en OPEN (apertura), y permanece estacionario en CLOSE (cierre). |

*1 : Esta unidad emplea la tecla "RANDOM", y el telemando emplea las teclas "◁◁ MANUAL SEARCH REV" y "RANDOM".
*2 : Esta unidad emplea la tecla "REPEAT", y el telemando emplea las teclas "▷▷ MANUAL SEARCH FWD" y "REPEAT".

Tabla 8-1

| N° de paso | Ajuste del osciloscopio V | Ajuste del osciloscopio H | Puntos de prueba | Puntos de ajuste | Itemes de comprobación/ Especificaciones de ajuste | Procedimiento de ajuste |
|---|---|---|---|---|---|---|
| **1** | **Ajuste de la desviación de seguimiento, enfoque y RF** | | | | | |
| | | | TP1<br>Patilla 2<br>(TRK. ERR) | VR5<br>(TRK. BAL) | Desviación de seguimiento 45é | ● Ponga la unidad en el modo de prueba. (※)<br>● Ponga VR5 TRK. BAL (equilibrio de seguimiento) en una posición aproximadamente 45é a la izquierda del centro*. |
| | | | | VR7<br>(TRK. OFS) | 0V ± 50mV | ● Ajuste VR7 TRK. OFS (desviación de seguimiento) de forma que la TRKG. ERR (tensión de error) de seguimiento de la patilla 2 de TP1 sea de 0V ± 50mV. |
| | | | TP1<br>Patilla 6<br>(FCS. ERR) | VR6<br>(FCS. OFS) | Desviación de enfoque 0V ± 50mV | ● Ajuste VR6 FCS. OFS (desviación de enfoque) de forma que la tensión de FOCS. ERR (error de enfoque) en pa patilla 6 de TP1 sea de 100mV ± 50mV. |
| | | | TP1<br>Patilla 1<br>(RF OUTPUT) | VR2<br>(RF. OFS) | Desviación de RF 100mV ± 50mV | ● Ajuste VR2 RF. OFS (desviación de RF) de forma que la tension de salida de RF de la patilla de TP1 sea de 100mV ± 50mV.<br><br>Nota : Cuando ajuste la desviación de seguimiento, realice siempre "6. Ajuste del equilibrio de seguimiento". |
| **2** | **Ajuste del nivel de RF** | | | | | |
| | | | TP1<br>Patilla 1<br>(RF OUTPUT) | VR1<br>(Alimentación de láser) | 1,5Vp-p $^{+0,2V}_{-0V}$ | ● Ponga la unidad en el modo de prueba. (※)<br>● Conecte el osciloscopio a la patilla 1 de TP1 (salida de RF), ponga en reproducción el disco de prueba, y mida la tensión de pico a pico de la forma de onda de RF.<br>● Ajuste VR1 (alimentación de láser) de forma que la tensión sea 1,5Vp-p $^{+0,2V}_{-0V}$. |
| **3** | **Comprobación de la energía del diodo lasér (LD)** | | | | | |
| | | | | | Menos de : 0,13mW | ● Ponga la unidad en el modo de prueba. (※)<br>● Presione la tecla TRACK FWD (▷▷\|) para activar el diodo lasér (LD).<br>● Coloque el modidor de potencia óptico directamente encima del objetivo y confirme que la potencia LD sea menos de 0,13mW. |
| **4** | **Comprobación de la sincronización del enfoque y del eje** | | | | | |
| | 0,5V/div | 100msec /div | TP1<br>Patilla 1<br>(Salida de RF) | | La seùal de RF sale<br><br>Giro en sentido de avance (hacia la derecha) | ● Instale el disco de prueba.<br>● Ponga la unidad en el modo de prueba. (※)<br>● Presione la tecla REPEAT para mover el captor hasta el centro del disco.<br>● Observe la salida de la patilla 1 de TP1 (salida de RF) en el osciloscopio. Compruebe si la seùal de RF sale después de presionar la tecla TRACK FWD (▷▷\|).<br>● Presione la tecla PLAY (▷) y compruebe si el disco gira a velocidad constante (aprox. 300 rpm cerca del centro del disco) en sentido de avance (hacia la derecha) ; el disco puede no girar o hacerlo hacia la izquierda. |

※ : Consulte la página 66.

| N° de paso | Ajuste del osciloscopio V | Ajuste del osciloscopio H | Puntos de prueba | Puntos de ajuste | Itemes de comprobación/ Especificaciones de ajuste | Procedimiento de ajuste |
|---|---|---|---|---|---|---|
| **5** | **Ajuste de retícula (1) (Cuando emplee un disco de 8 cm.)** | | | | | |
| | | | | | | Nota : Este ajuste podrá realizarse empleando un disco de 8 cm que posea los hoyos dentro de un diámetro de 75 mm.<br>● Ponga la unidad en el modo de prueba. (※)<br>● Instale el 8 cm disco de prueba, desplace el captor hasta la pista exterior de forma que el orificio de ajuste de retícula del captor quede visible desde la superficie de hoyos del disco o a través del orificio del mecanismo de servos (consulte la Fig. 8-2).<br>● Presione secuencialmente las teclas TRACK FWD (▷▷\|) y PLAY (▷) para cerrar los servos de enfoque y del eje (no cierre el servo de seguimiento).<br>● Inserte un filtro de paso bajo de 4kHz de corte entre el osciloscopio y la patilla 3 (TRK. ERR) y 5 (GND) de TP1, como se muestra en la Fig. 8-3, y observe la forma de onda de la patilla 3 de TP1 (error de seguimiento) en el osciloscopio. |
| | 0,5V/div | 5msec /div | TP1 Patilla 2 (TRK. ERR) | Tornillo de ajuste de retícula | Punto nulo | ● Inserte un ⊖ destornillador en el orificio del tornillo de ajuste de retícula, gire y halle el punto nulo (consulte la foto 8-1). |
| | | | | Tornillo de ajuste de retícula | Amplitud máxima | ● A continuación, gire lentamente ⊖ destornillador **HACIA LA IZQUIERDA** desde el punto nulo hasta que la forma de onda (seùal de error de seguimiento) alcance la máxima amplitud (consulte la foto 8-2). |
| | | | | | | Nota : Tenga cuidado, porque si inserta el destornillador a la fuerza, la unidad captora se elevará. |
| | | | | | | ● Por último, confirme que no haya gran fluctuación la tensión de pico a pico de la seùal de error de seguimiento (no inserte el filtro de paso bajo de 4 kHz de corte) cuando el captor se desplace de la pista más interior a la más exterior del disco. Si la diferencia es mayor del 10 % o más, vuelva a girar el tornillo de ajuste de retícula y ajuste la señal de error al máximo. |

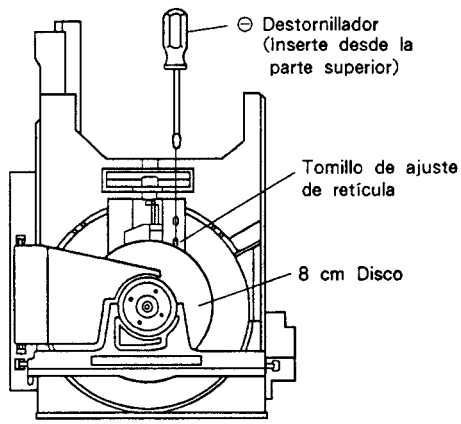



Fig. 8-2

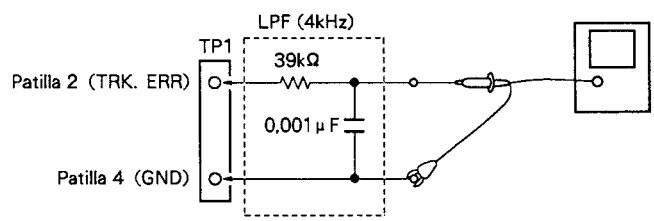



Fig. 8-3

※ : Consulte la página 66.

| N° de paso | Ajuste del osciloscopio V | Ajuste del osciloscopio H | Puntos de prueba | Puntos de ajuste | Itemes de comprobación/ Especificaciones de ajuste | Procedimiento de ajuste |
|---|---|---|---|---|---|---|
| 5' | **Ajuste de retícula (2) (Cuando no disponga de disco de 8 cm.)** | | | | | |

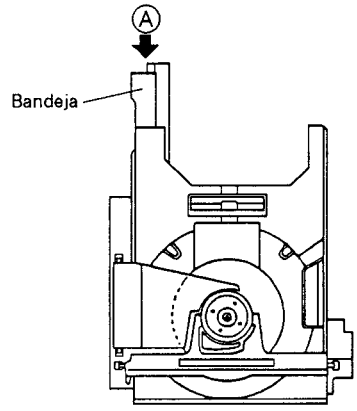



Fig. 8-4

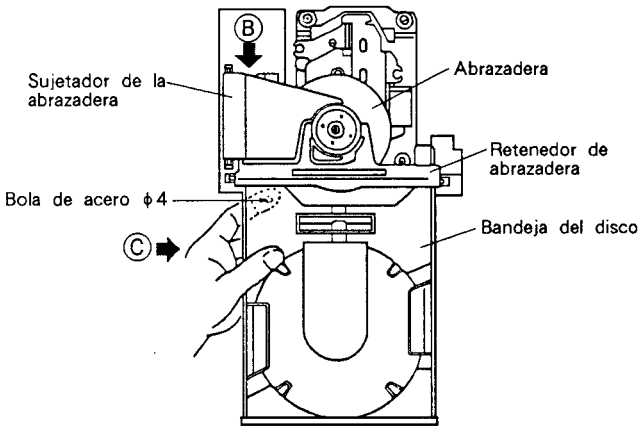



Fig. 8-5

Este ajuste se realiza cuando no haya disco de 8 cm disponible, y el ajuste de retícula (1) no pueda realizarse. Para realizar este ajuste, extraiga la bandeja del disco.

● Extracción de la bandeja del disco.

1. Presione el borde posterior del bastidor, marcado con Ⓐ en la Fig. 8-4, (∗1) tirando de la bandeja del disco hasta la posición en la que agarre, mostrada en la Fig. 8-5.

(∗1) Si presiona el borde posterior del bastidor Ⓐ, se libera la abrazdera de discos. Si continua presionando después de que se haya liberado completamenta la abrazadera, sale eyectada la bandeja del discos.

2. Tirando del soporte de abrazadera Ⓑ (consulte la Fig. 8-5) hacia arriba con la mano derecha, suje te la bandeja como se indica en Ⓒ con la mano izquierda y tire de ella hacia afuera. Tenga cuidado para que no caiga la bola de acero ϕ4 (recomendamos sujetar la bola en su lugar con el dedo indice de la mano izquierda al sacar la bandeja).

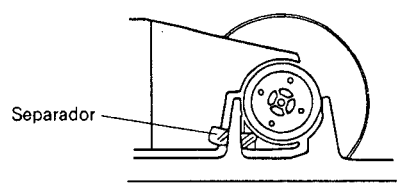



Fig. 8-6

Fig. 8-7

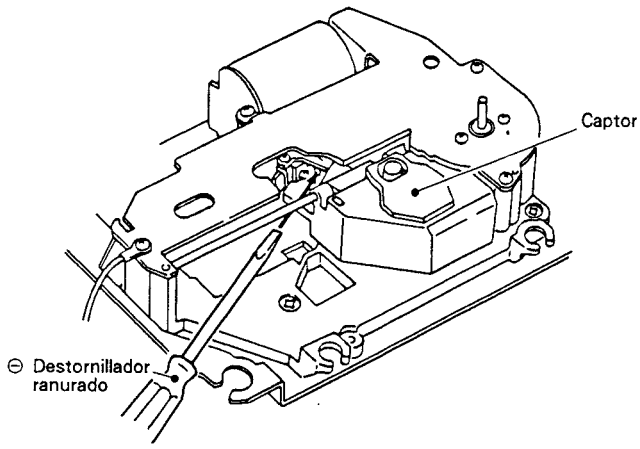
<table>
<tr><th rowspan="2">N° de paso</th><th colspan="2">Ajuste del osciloscopio</th><th rowspan="2">Puntos de prueba</th><th rowspan="2">Puntos de ajuste</th><th rowspan="2">Itemes de comprobación/ Especificaciones de ajuste</th><th rowspan="2">Procedimiento de ajuste</th></tr>
<tr><th>V</th><th>H</th></tr>
<tr><td></td><td colspan="5"> 

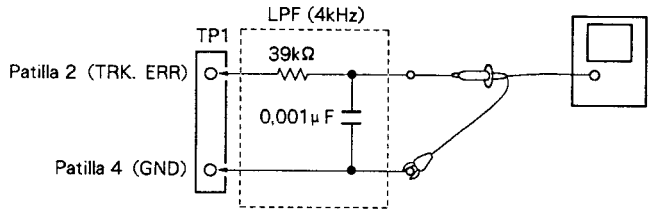
Fig. 8-8


Fig. 8-9</td><td>● Ponga la unidad en el modo de prueba. (※)<br>● Presione la tecla REPEAT para mover el captor hasta cerca de lo que sería el centro del disco. Coloque el captor de forma que su tornillo de ajuste de reticula se vea a través del orificio alargado situado al lado del motor del eje de la placa base del mecanismo deservos.<br>● Como se muestra en la Fig. 8-8, inserte un ⊖ destornillador (ranurado) desde la parte posterior del mecanismo y compruebe si puede girar el tornillo de ajuste de retícula.<br>● Instale el disco de prueba, aseúrese de insertar un separador de 3 – 5 mm (si no dispone de separador emplee una llave haxagonal) entre el sujetador de abrazadera y el retenedor de abrazadera, como se muestra en la Fig. 8-6.<br>● Confirme que la abrazadera y el retenedor de la misma no estén en contacto entre si (Fig. 8-7).<br>● Presione secuencialmente las teclas TRACK FWD (▷▷|) y PLAY (▷) para cerrar los servos de enfoque y del eje (no cierre el servo de seguimiento).<br>● Inserte un filtro de paso bajo de 4 kHz de corte entre el osciloscopio y la patilla 3 (TRK. ERR) y 5 (GND) de TP1, como se muestra en la Fig. 8-9, y observe la forma de onda de la patilla 3 de TP1 (error de seguimiento) en el osciloscopio.</td></tr>
<tr><td></td><td>0,5V/div</td><td>5msec /div</td><td>TP1<br>Patilla 2<br>(TRK. ERR)</td><td>Tornillo de ajuste de retícula<br><br>Tornillo de ajuste de retícula</td><td>Punto nulo<br><br>Amplitud máxima</td><td>● Gire el tornillo de ajuste de reticula con el destornillador hasta encontrar el punto nulo (consulte la foto 8-1).<br>● A continuación, gire lentamente el ⊖ destornillador HACIA LA IZQUIERDA de punto null y ajùstelo hasta el punto en el que la forma de onda (seùal de error de seguimiento) llegue por primera vez a su máxima amplitud (consulte la foto 8-2).<br><br>Nota : Evite aplicar excesiva presión al ⊖ destornillador cuando ajuste el tomillo. De lo contrario, el captor se moverá hacia adentro haciendo más dificil el ajuste.<br><br>● Por último, desconecte el filtro de paso bajo y confirme que la tensión de pico a pico de la seùal de error de seguimiento (no inserte el filtro de paso bajo de 4 kHz de corte) no varie mucho cuando el captor se mueva de la pista más interior a la más exterior del disco. Si los niveles diferen en un 10% o más, reajuste el punto de error de amplitud máxima girando el tornillo de ajuste de retícula.</td></tr>
</table>

※ : Consulte la página 66.

| N° de paso | Ajuste del osciloscopio V | Ajuste del osciloscopio H | Puntos de prueba | Puntos de ajuste | Itemes de comprobación/ Especificaciones de ajuste | Procedimiento de ajuste |
|---|---|---|---|---|---|---|
| | | | | | | Una vez finalizado el ajuste de retícula, vuelva a montar la bandeja del disco de acuerdo con el procedimiento siguiente.<br>1. Extraiga el disco y el separador.<br>2. Levantando el sujetador de abrazadera (marcado con Ⓑ en la Fig. 8-5) con la mano izquierda, sujete la bandeja con la mano izquierda como se indica en Ⓒ y deslica la base deslizable en los acopladores de resina rigida de la base de carga como se muestra en la Fig. 8-10 para reinsertar la bandeja del disco.<br>En este momento, asegûrese de sujetar la bola de acero en su lugar con el dedo indice de la mano izquierda. Además, tenga cuidado para no dañar el panel frontal con la base deslizable y el cojinete de boals de acero (de la base deslizable).<br>3. Inserte la base deslizable de forma que encaje en los dos acopladores de resina rigida de la parte posterior de la base de carga (consulte la Fig. 8-11).<br>4. Inserte completamente la bandeja del disco. |

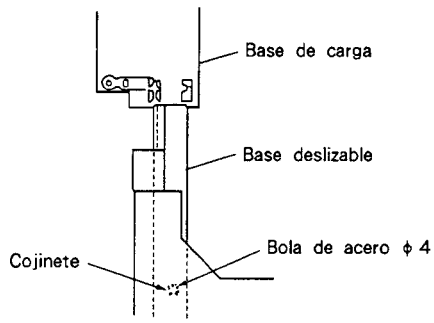



Fig. 8-10

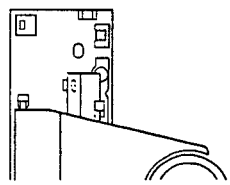


Fig. 8-11

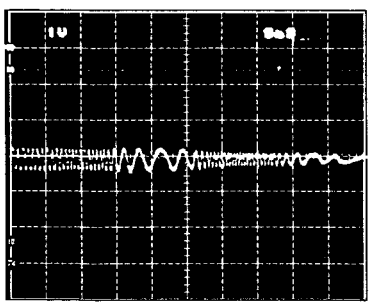


Foto 8-1
Punto nulo

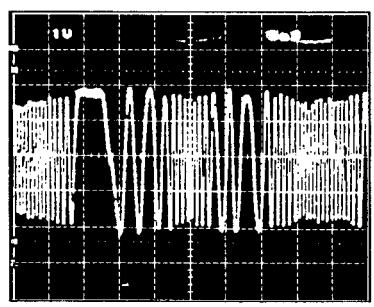


Foto 8-2
Amplitud máxima

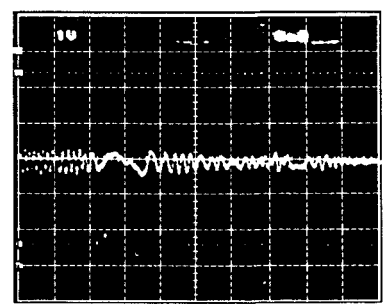
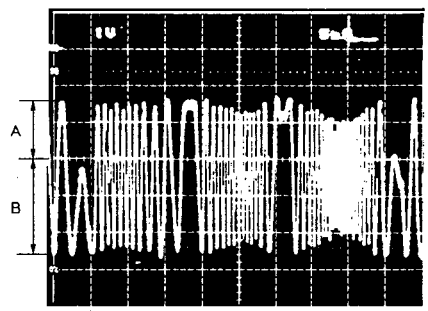


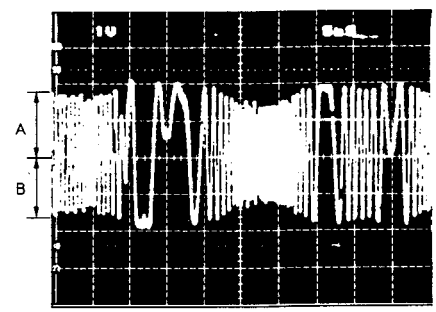
Foto 8-3
Esta no es la forma de onda de punto nulo

| N° de paso | Ajuste del osciloscopio V | Ajuste del osciloscopio H | Puntos de prueba | Puntos de ajuste | Itemes de comprobación/ Especificaciones de ajuste | Procedimiento de ajuste |
|---|---|---|---|---|---|---|
| **6** | **Ajuste del equilibrio de seguimiento** | | | | | |
| | 0,5V/div | 5msec /div | TP1 Patilla 2 (TRK. ERR) | VR5 (TRK. BAL) | | ● Instale el disco de prueba.<br>● Ponga la unidad en el modo de prueba. (※)<br>● Presione la tecla REPEAT para colocar el captor cerca del centro del disco.<br>● Presione secuencialmente las teclas TRACK FWD (▷▷\|) y PLAY (▷) para hacer que el disco gire.<br>● Observe la forma de onda (error de seguimiento) de la patilla 2 (TRK. ERR) de TP1 en el osciloscopio, y ajuste VR5 TRK. BAL (equilibrio de seguimiento) para eliminar los elementos de CC de la señal de error de seguimiento. |



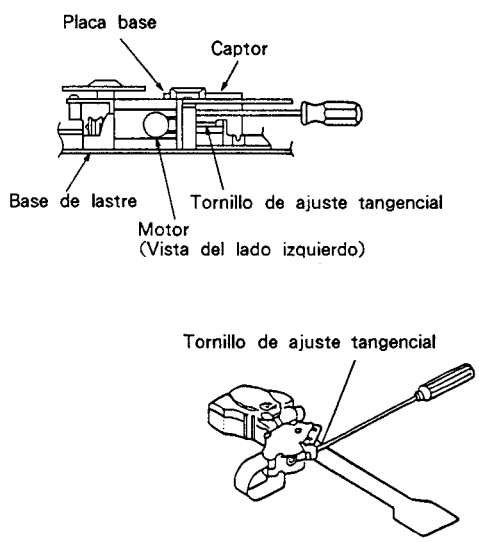

A ≠ B

Foto 8-4 Elementos de CC mezclados en la señal




A = B

Foto 8-5 Elementos de CC eliminados

| | | |
|---|---|---|
| **7** | **Ajuste tangencial** | |
| |  <br>Fig. 8-12 | ● Ponga la unidad en el modo de prueba. (※)<br>● Abrir la bandeja y instale el disco prueba.<br>● Presione la tecla REPEAT para colocar el captor cerca del centro del disco.<br>● Inserte una llave hexagonal en la sección del tornillo de ajuste tangencial desde la parte posterior del mecanismo.<br>● Cierre la bandeja.<br><br>Note: No emplee una llave hexagonal en forma de L Emplee una como la mostrada a la izquierda. Si emplea una llave hexagonal en forma de L Puede hacer que se afloje la bandeja [consulte la página 70 5'. "Ajuste de retícula (2)"].<br><br>● Presione secuencialmente las teclas TRACK FWD (▷▷\|) y PLAY (▷) para cerrar los servos (el indicador de PLAY se encenderá). |

※ : Consulte la página 66.

| N° de paso | Ajuste del osciloscopio V | Ajuste del osciloscopio H | Puntos de prueba | Puntos de ajuste | Itemes de comprobación/ Especificaciones de ajuste | Procedimiento de ajuste |
|---|---|---|---|---|---|---|
| | | 200nsec /div | TP1 Patilla 1 Salida de RF | Tornillo de ajuste tangencial | Patrón ocular más nitido posible | ● Observe la forma de onda de la patilla 1 de TP1 (salida de RF) en el osciloscopio, y ajuste el tornillo de ajuste tangencial hasta lograr el patrón ocular más nitido posible.<br>● El punto en el que el tomillo de ajuste tendrá que quedar está aproximadamente en mitad de los puntos en los que el patrón ocular se vuelve más borroso al girar dicho tornillo hacia la derecha y la izquierda. Cuando toda la forma de onda sea clara, concentre o aguce las lineas finas que forman el diamante en el centro del patrón ocular (consulte la foto 8-8). Ajuste hasta que las lineas finas de los cuatro lados del diamante queden nitidamente definidas y densas, como se muestra en la foto 8-6.<br>Nota : Emplee una llave haxagonal para levantar algo en captor cuando realice este ajuste. |

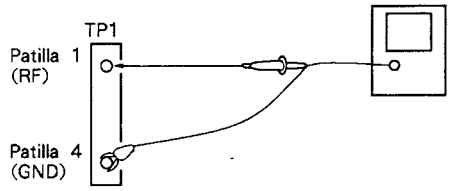



Fig. 8-13

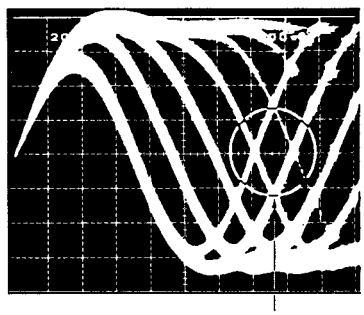



Foto 8-6

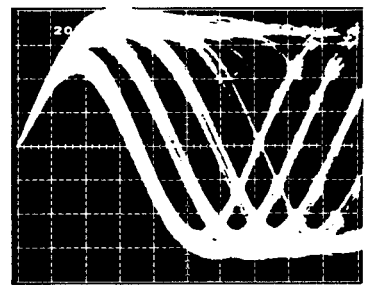


Foto 8-7

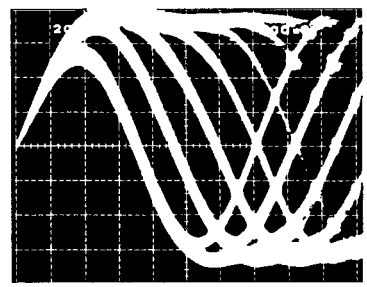


Foto 8-8

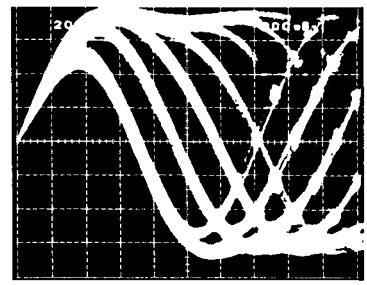


Foto 8-9

| N° de paso | Ajuste del osciloscopio V | Ajuste del osciloscopio H | Puntos de prueba | Puntos de ajuste | Itemes de comprobación/ Especificaciones de ajuste | Procedimiento de ajuste |
|---|---|---|---|---|---|---|
| **8** | **Ajuste de la ganancia de enfoque** | | | | | |
| | 20mV/div CH1 (X) 5mV/div CH2 (Y) (sonda 10 : 1) | | Eje X : TP1 Patilla 5 (FCS. IN) Eje Y : TP1 Patilla 6 (FCS. ERR) | VR3 (FCS. GAN) | Diferencia de fase de 90é | ● En el estado de POWER OFF (apagado), conecte el osciloscopio y el oscilador como se muestra en la Fig. 8-14.<br>● Ponga la unidad en el modo de reproducción normal.<br>● Conecte la alimentación del oscilador y ajuste su salida a una seùal de 1,2kHz, 1Vp-p.<br>Nota : Algunos osciladores descargan una tensión CC cando se conecta su alimentación. Pro lo tanto, se recomenda conectar el oscilador después de haber conectado su alimentación.<br>● Ajuste VR3 FCS. GAN (ganancia de enfoque) de forma que la figura de Lissajous se convierta en un circulo horizontal (diferencia de fase de 90é). (Foto 8-11) |

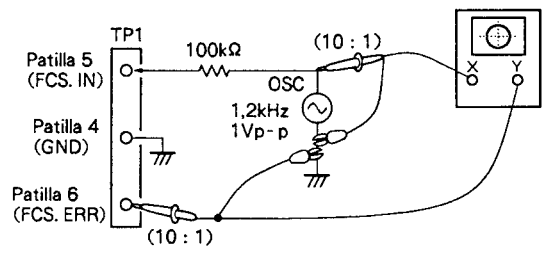



Fig. 8-14

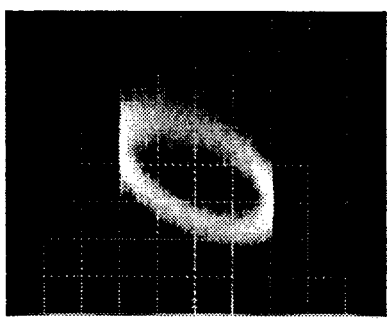


Foto 8-10
Ganancia sobrecompensada

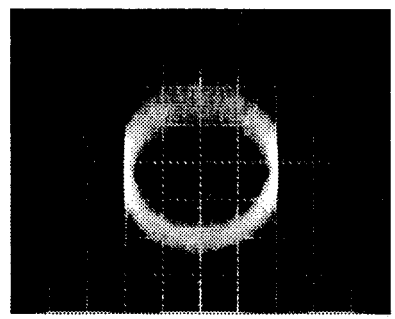


Foto 8-11
Ganancia óptima

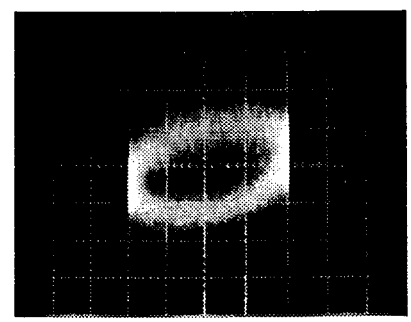


Foto 8-12
Ganancia subcompensade

| N° de paso | Ajuste del osciloscopio V | Ajuste del osciloscopio H | Puntos de prueba | Puntos de ajuste | Itemes de comprobación/ Especificaciones de ajuste | Procedimiento de ajuste |
|---|---|---|---|---|---|---|
| **9** | **Ajuste de la ganancia de seguimiento** | | | | | |
| | | | | | | ● En el estado de POWER OFF (apagado), conecte el osciloscopio y el oscilador como se muestra en la Fig. 8-15.<br>● Ponga la unidad en el modo de reproducción normal.<br>● Conecte la alimentación del oscilador y ajuste su salida a una seùal de 1,2kHz, 2Vp-p.<br><br>Nota : Algunos osciladores descargan una tensión CC cuando se conecta su alimentación. Por lo tanto, se recomienda conectar el oscilador después de haber conectado su alimentación. |
| | 50mV/div CH1 (X) 5mV/div CH2 (Y) (sonda 10 : 1) | | Eje X : TP1 Patilla 3 (TRK. IN) Eje Y : TP1 Patilla 2 (TRK. ERR) | VR4 (TRK. GAN) | Diferencia de fase de 90é | ● Ajuste VR4 TRK . GAN ( ganancia de seguimiento ) de forma que la figura de Lissajous se convierta en un circulo horizontal (diferencia de fase de 90é). (Foto 8-14) |

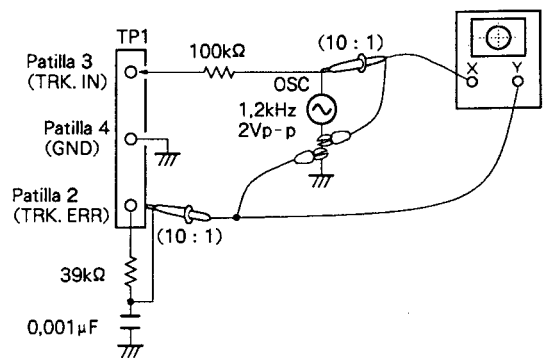



Fig. 8-15

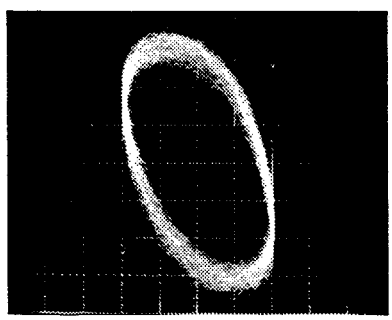


Foto 8-13
Ganancia sobrecompensade

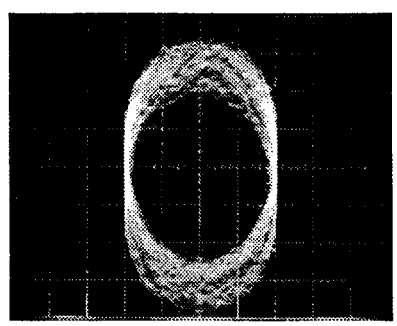


Foto 8-14
Ganancia óptima

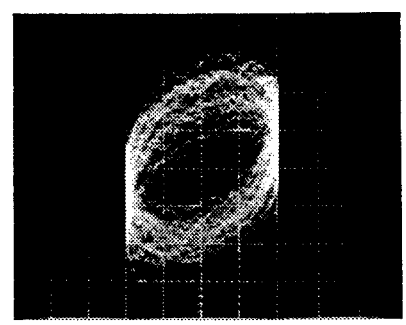
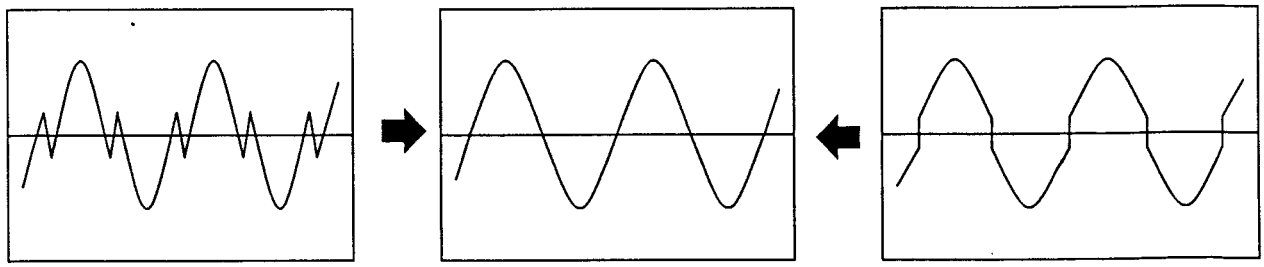


Foto 8-15
Ganancia subcompensade

| N° de paso | Ajuste del osciloscopio V | Ajuste del osciloscopio H | Puntos de prueba | Puntos de ajuste | Itemes de comprobación/ Especificaciones de ajuste | Procedimiento de ajuste |
|---|---|---|---|---|---|---|
| **10** | **Ajuste de la frecuencia de oscilación libre del oscilador controlado por tensión (VCO)** | | | | | |
| | | | TP2<br>Patilla 2<br>(PLCK) | VR8<br>(VCO. ADJ) | 4,275 ± 0,025MHz | ● Ponga la unidad en el modo de prueba. (※)<br>● Cortocircuite ASY y GND con un ⊖ destornillador a algún objeto similar. (※)<br>● Conecte un frecuencimetro capaz de medir frecuencias de más 10MHz a la patilla 2 de TP2.<br>● Ajuste VR8 (ajuste del VCO) hasta que el frecuencimetro indique 4,275 ± 0,025MHz. |
| **11** | **Método para confirmar el carácter S (error de enfoque)** | | | | | |
| | | | TP1<br>Patilla 6<br>(FCS. ERR) | | | ● Ponga la unidad en el modo de prueba. (※)<br>● Conecte a masa la patilla 5 de TP1 (ganancia de enfoque).<br>● Observe la forma de onda de salida de la patilla 6 FCS. ERR de TP1 (error de enfoque) al presionar la tecla TRACK FWD (▷▷\|). |
| **12** | **Ajuste de MSB** | | | | | |
| | 5mV/div | 0.2msec / div | JA1 terminal LINE OUTPUT (canal derecho) | VR9 | Onda senoidal | ● Ponga la unidad en el modo de reproducción normal.<br>● Reproduzca la canción 20 ( − 60 dB, 1kHz, canales izquierdo y derecho) del disco de prueba (YEDS-7). Conecte el osciloscopio a el canal derecho del terminal LINE OUTPUT (JA1), y observe la forma de onde de salida de audio.<br>● Ajuste VR9 MSB ( canal derecho ) hasta obtener una forma de onda senoidal en el osciloscopio. |
| | | | JA1 terminal LINE OUTPUT (canal izquierdo) | VR10 | Onda senoidal | ● Ajuste VR10 (canal izquierdo) de la misma forma. |

**● Forma de onda de la distorsion del punto de intersección del eje con cero**



NG　　OK　　NG

※ : Consulte la página 66.

## 8.2 AJUSTE SECCIÓN DEL SINTONIZADOR

- Los puntos de ajuste se muestran en la Fig. 8-18.

### 8.2.1 Sección del sintonizador de FM

- Realice las conexiones mostradas en la Fig. 8-16.
- Presionar la tecla BAND para ajustar al mode FM.

| Paso N° | FM SG (1kHz, ±75kHz de desviación) | | FD – J7 Indicación de la frecuencia recibida | Ajuste | |
|---|---|---|---|---|---|
| | Frecuencia (MHz) | Nivel (dBμ) | | Posición de ajuste | Especificaciones |
| 1 | 98.0 | 60 | 98.0MHz | L705 | Ajuste de forma que el voltage entre los terminales REF y TM en la unidad TUNR sea 0V ± 100mV. |
| 2 | 98.0 | 60 | 98.0MHz | — | Compruebe si el nivel de TX-L (CN272-1) y TX-R (CN272-3) es − 1,5dBV $^{+2.0}_{-4.0}$ dB. |
| 3 | 98.0 | 32 | 98.0MHz | — | Compruebe si el factor de distorsión de TX-L (CN272-1) es inferior a 3%. |
| 4 | 98.0 | 60 (Sin modulación) | 98.0MHz | VR701 | Ajuste la frecuencia del terminal de VCO en la unidad TUNR a 76kHz ± 200Hz. (* 2) |
| 5 | 98.0 | 60 (* 1) | 98.0MHz | — | Compruebe si los niveles de TX-L (CN272-1) y TX-R (XN272-3) son inferiores a 1,5%. |
| 6 | 98.0 | 60 (* 1) | 98.0MHz | — | Compruebe si las separaciones de TX-L (CN272-1) y TX-R (CN272-3) son superiores a 27dB. |
| 7 | 98.0 | Variable (* 1) | 98.0MHz | — | Compruebe si los indicadores TUNED y STEREO se encienden y se apagan a medida que el nivel de FM SG se aumente gradualement. |
| 8 | 98.0 | 60 (* 1) | 98.0MHz | — | Presione el interruptor MODE situado en el panel frontal, y compruebe si el modo se vuelve monoaural. |

(*1) Modulación en estéreo : Principal 1kHz canales izquierdo + derecho ± 68.25kHz de desviación.
Piloto 19kHz ± 6.75kHz de desviación.
(*2) Después de haber conectado la alimentación, si no se han transcurrido 2 minutos, ajuste a 76,2kHz ± 300Hz.

### 8.2.2 Sección del sintonizador de AM

- Para el tipo KU, realice solamente los pasos 4 a 6 para la comprobación.
- Realice las conexiones mostradas en la Fig. 8-17.
- Presionar la tecla BAND para ajustar al mode AM.
- Para el tipos HEI y HB, realice el ajuste de los pasos 1 a 7.

| Paso N° | AM SG (400Hz, 30% de modulación) | | FD – J7 Indicación de la frecuencia recibida | Ajuste | |
|---|---|---|---|---|---|
| | Frecuencia (kHz) | Nivel (dBμ) | | Posición de ajuste | Especificaciones |
| 1 | 603 | 30 | 603kHz | Ⓐ side of MW block TC701 | Ajuste el voltage del terminal de SM a su máximo. |
| | 1395 | | 1395kHz | | |
| 2 | Repita el paso 1 hasta que alcance el voltaje máximo. | | | | |
| 3 | 603 | 30 | 603kHz | F702 | Ajuste el voltage del terminal de SM a su máximo. |
| 4 | (1000 : Solamente del KU) 999 | Variable | (1000kHz : Solamente del KU) 999kHz | — | Compruebe si el indicador TUNED se enciende y se apaga a medida que el nivel de AM SG se aumente gradualmente. |
| 5 | (1000 : Solamente del KU) 999 | 74 | (1000kHz : Solamente del KU) 999kHz | — | Compruebe si el nivel de TX-L (CN272-1) y TX-R (CN272-3) es − 14,5dBV ± 4dB. |
| 6 | (1000 : Solamente del KU) 999 | Variable | (1000kHz : Solamente del KU) 999kHz | — | Compruebe si el nivel de entrada de la antena que es de − 10dB menos que la salida nominal se vuelve superior a 22dBμV. |
| 7 | 164 | 74 | 164kHz | — | Compruebe si se pueden recibir ambas frecuencias, 164kHz y 254kHz. |
| | 254 | | 254kHz | | |

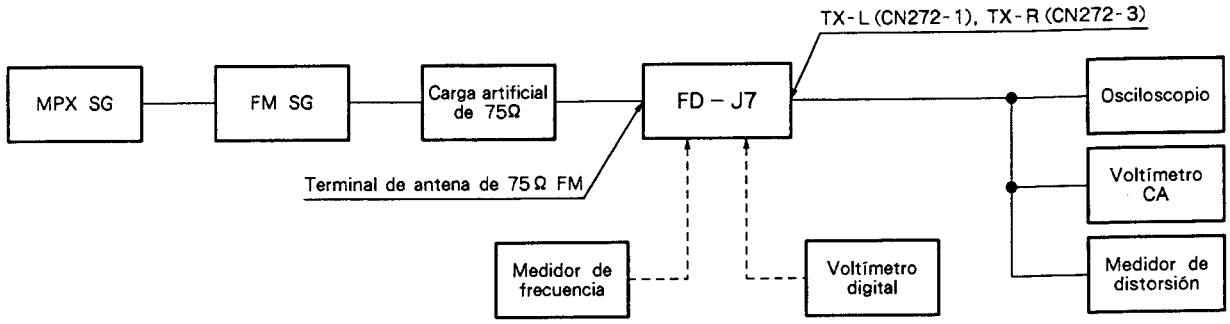



Fig. 8-16 Esquema de conexiones de ajuste FM

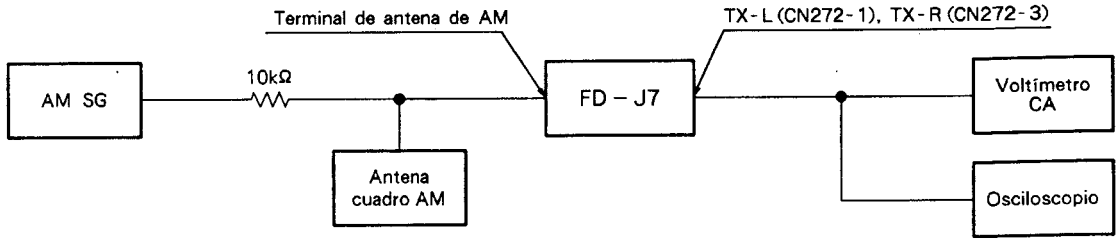



Fig. 8-17 Esquema de conexiones de ajuste AM

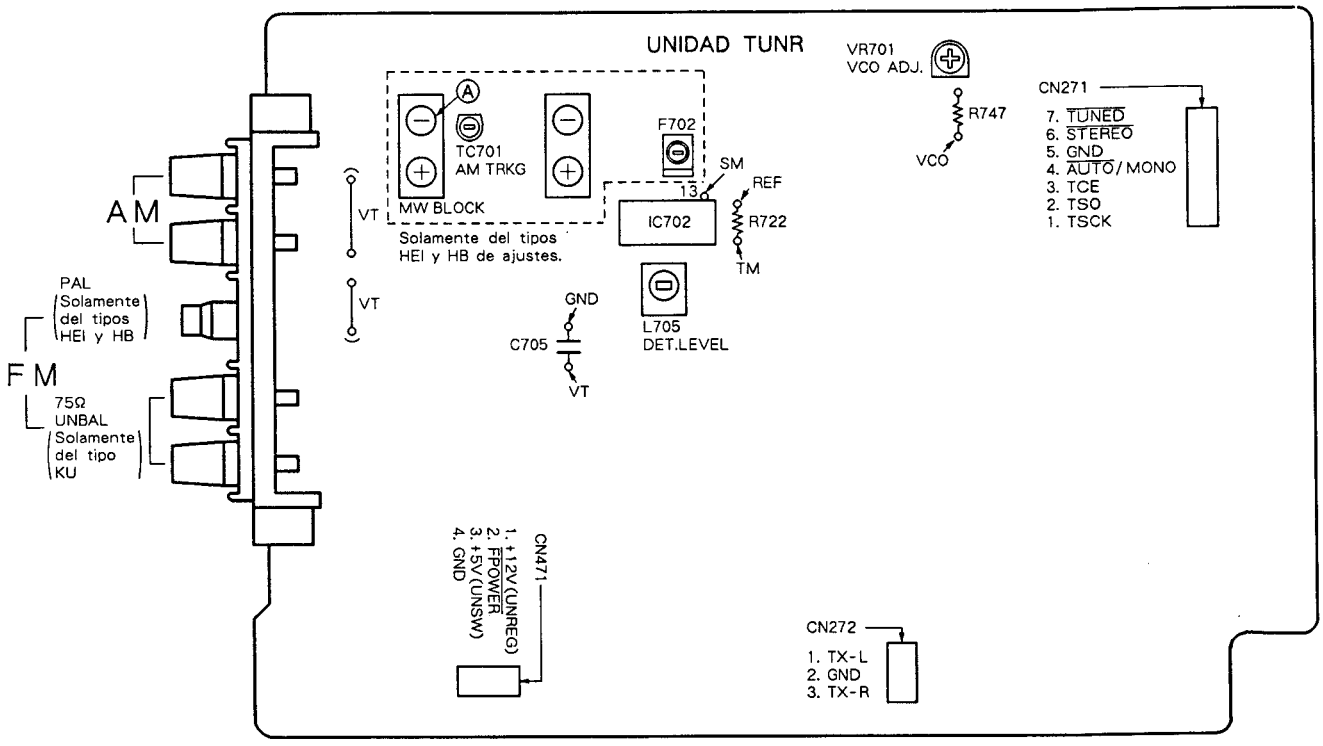



Fig. 8-18 Punto de ajuste

# 9. IC INFORMATION

## ■ PD4209 (IC5)

### 9.1. Overview of the system control microcomputer (PD4209)

#### 9.1.1 Functions of the PD4209

The PD4209 has the following functions.

① System power ON/OFF control and power-failure backup.
② Switching control between the tuner and the CD modes.
③ Timer functions (clock, timer playback/recording, sleep function)
④ Tuning control for the two-band FM/AM tuner.
⑤ Key input (including those on remote control unit) for the tuner and CD player and LCD/LED indications.
⑥ Function and muting control for the amplifier.
⑦ Control of CD-synchronizing recording.

#### 9.1.2 Configuration of the PD4209

The diagrams of the blocks around the PD4209 and the function allocations to the terminals are shown below.

Fig. 9-1 shows the block diagram around the CPU.

Pin designations and functions of the microcomputer are listed in Table 9-1.

This microcomputer uses an LCD driver (LC7582) and an IC for parallel conversion (PD0012A) for output expansion.

The PD0012A is used for LED displays and key scanning on the CD/tuner block.

Pin designations and functions of the output expansion IC (PD0012A) are shown in Table 9-2.

Pin designations and functions of the LCD driver (LC7582) are shown in Table 9-3.

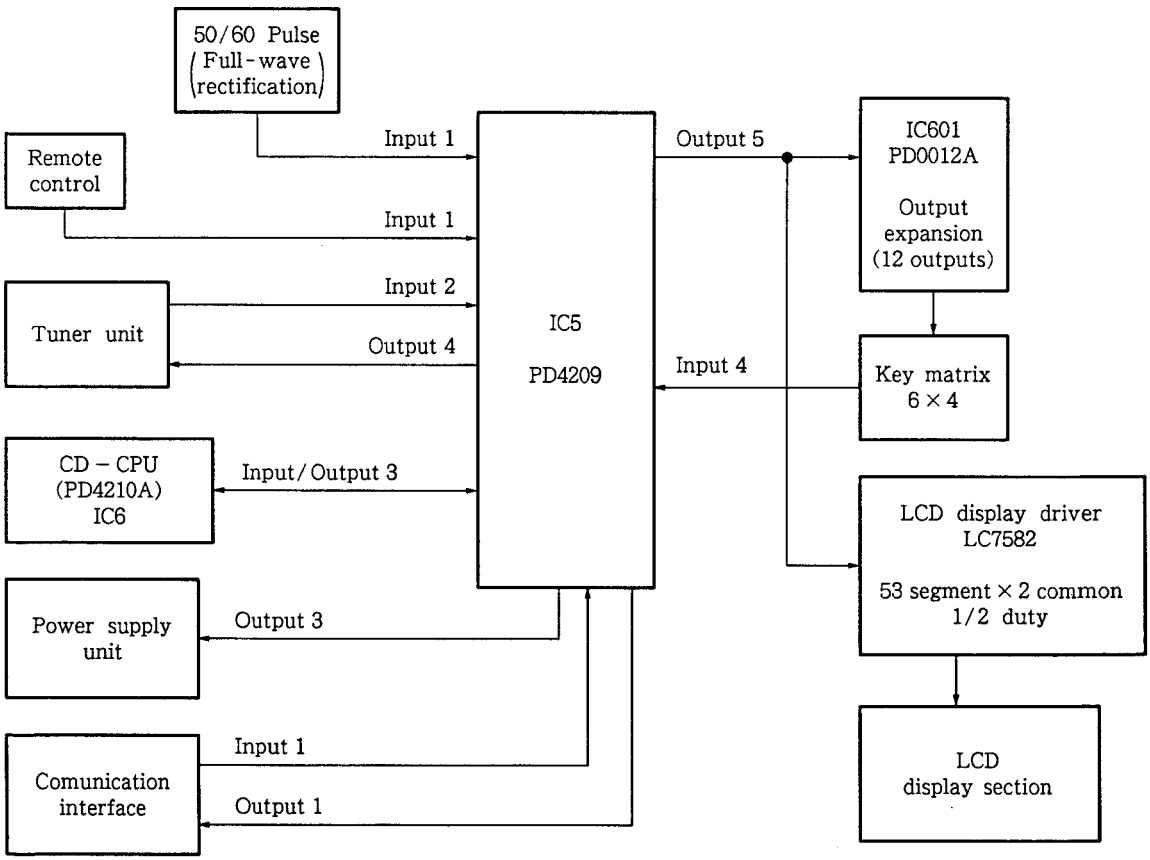



Fig. 9-1 Block diagram around the CPU

| Pin | Pin name | I/O | Function | Active | At the reset |
|---|---|---|---|---|---|
| 1 | XT1 | I | Connect the sub-system clock oscillator (GND connection) | | |
| 2 | XT2 | I | Connect the sub-system clock oscillator (OPEN) | | |
| 3 | $\overline{\text{RESET}}$ | I | Reset input | L | |
| 4 | X1 | I | Connect the ceramic oscillator (4.19MHz) | | |
| 5 | X2 | I | Connect the ceramic osclator (4.19MHz) | | |
| 6 | MPOWER | O | System powr ON/OFF | H | L |
| 7 | CDPOWER | O | CD power ON/OFF | H | L |
| 8 | FPOWER | O | Tuner power ON/OFF | H | L |
| 9 | $\overline{\text{MUTE}}$ | O | System mute | L | L |
| 10 | ASELCD | O | Audio selection CD/$\overline{\text{TUNER}}$ | | L |
| 11 | $\overline{\text{CDRESET}}$ | O | CD reset output | L | L |
| 12 | NC | I | N.C. | | |
| 13 | SIO | I/O | Serial input/output (SB0) | | Hi-Z |
| 14 | SCK | I | Serial clock input | | |
| 15 | – | I | Connect to GND | | L |
| 16 | LWIN | I | LW band $\overline{\text{Exist}}$/Not exist | | L/H |
| 17 | 50/60 | I | 50/60Hz Pulse input of full-wave rectification | H | |
| 18 | REMOTE | I | Remote control input | L | |
| 19 | SYSI | I | Command input | L | |
| 20 | Vpp | | +5V | | |
| 21 | VDD | | +5V power supply (backup) | | |
| 22 | LCDCE/BUZ | O | LCD driver chip enable/buzzer output | H/ | L |
| 23 | EXDATA | O | Data output of LCD driver and output expansion | | L |
| 24 | EXCLK | O | Clock output of LCD driver and output expansion | | L |
| 25 | $\overline{\text{EXPCE}}$ | O | Output expansion chip enable | L | L |
| 26 | KEYIN3 (KI3) | I | Key input 3 | L | |
| 27 | KEYIN2 (KI2) | I | Key input 2 | L | |
| 28 | KEYIN1 (KI1) | I | Key input 1 | L | |
| 29 | KEYIN0 (KI0) | I | Key input 0 | L | |
| 30 | $\overline{\text{LCDINH}}$ | O | Output of LCD driver forced goes out | L | L |
| 31 | TCE | O | Enable output for Tuner | H | L |
| 32 | TSO | O | Serial data output for Tuner | | L |
| 33 | TSCK | O | Serial clock output for Tuner | | L |
| 34 | $\overline{\text{TUNED}}$ | I | Detection input of the Tuner tuning | L | |
| 35 | $\overline{\text{STEREO}}$ | I | Detection input of the stereo broadcasting | L | |
| 36 | $\overline{\text{9K}}$/10K | I | Switching input of the reference frequency | | |
| 37 | J/$\overline{\text{EX}}$ | I | Japan/$\overline{\text{Export}}$ input | | L |
| 38 | $\overline{\text{AUTO}}$/MONO | O | $\overline{\text{AUTO}}$/MONO output | | L |
| 39 | $\overline{\text{DX}}$/LOCAL | O | $\overline{\text{DX}}$/LOCAL output | | L |
| 40 | NC | O | N.C. | | |
| 41 | SYSO | O | System communication output | | L |
| 42 | Vss | | GND for powr supply | | |

Table 9-1 Pin functions of PD4209

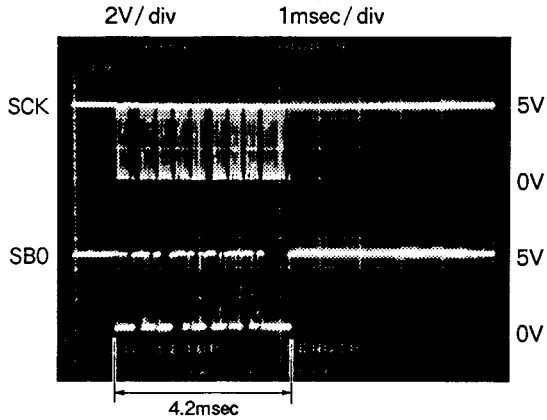
| Pin | Pin name | I/O | Function | Active | Pin | Pin name | I/O | Function | Active |
|---|---|---|---|---|---|---|---|---|---|
| 1 | DATA | I | Serial data input | | 10 | KS5 | O | Key scan output 5 | L |
| 2 | CLK | I | Serial clock input | | 11 | NC | O | N.C. | |
| 3 | $\overline{CE}$ | I | Chip enable input | L | 12 | NC | O | N.C. | |
| 4 | KS0 | O | Key scan output 0 | L | 13 | NC | O | N.C. | |
| 5 | KS1 | O | Key scan output 1 | L | 14 | TUNERIND | O | Tuner indicator | L |
| 6 | KS2 | O | Key scan output 2 | L | 15 | STBYIND | O | Power standby indicator | L |
| 7 | KS3 | O | Key scan output 3 | L | 16 | PLAYIND | O | CD play indicator | L |
| 8 | KS4 | O | Key scan output 4 | L | 17 | RESET | I | Reset input | L |
| 9 | GND | | GND | | 18 | Vcc | | Power supply (UNSW 5V) | |

Table 9-2 Pin functions of PD0012A

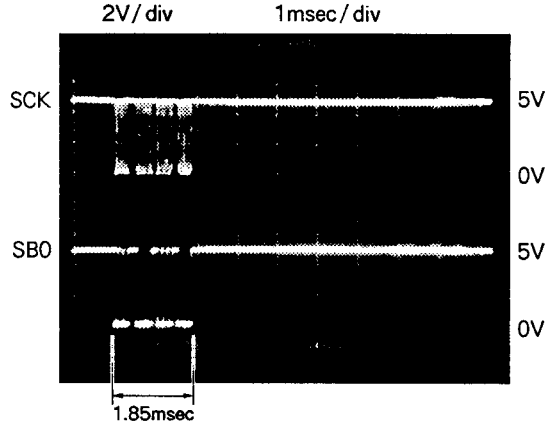
| Pin | Pin name | I/O | Function | Active | Pin | Pin name | I/O | Function | Active |
|---|---|---|---|---|---|---|---|---|---|
| 1 – 54 | S1 – S53 | O | Segment output | | 59 | Vss | I | GND | |
| 55 | OSC | I | Oscillation input | | 60 | CE | I | Chip enable input | H |
| 56 | VDD | I | Power supply (UNSW5V) | | 61 | CLK | I | Serial clock input | |
| 57 | $\overline{INH}$ | I | Display goes out input | L | 62 | DATA | I | Serial data input | |
| 58 | VLCD | I | Pin for set the voltage of LCD bias (Connect to $V_{DD}$) | | 63 | COM2 | O | Common output | |
| | | | | | 64 | COM1 | O | Common output | |

Table 9-3 Pin functions of LC7582

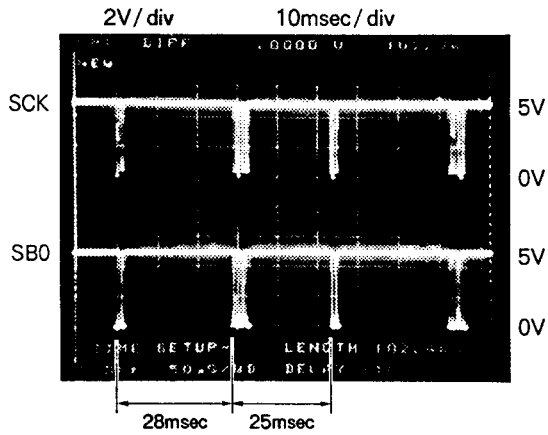
Communication with CD microcomputer (PD4210A) in WRITE
SCK : Pin 14 (PD4209)  SBO : Pin 13 (PD4209)
Approx. 4.2ms at a time (9 byte)



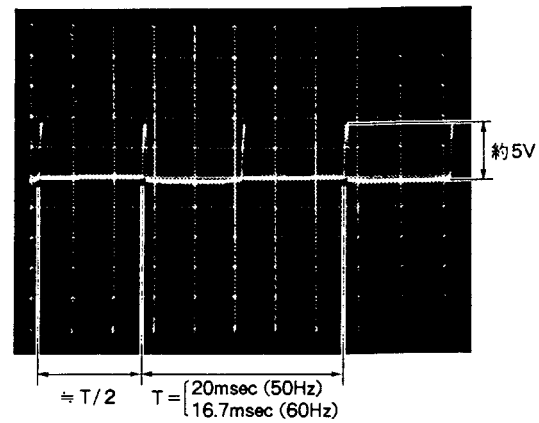

Communication with CD microcomputer (PD4210A) in READ
Approx. 1.85ms at a time (4 byte)



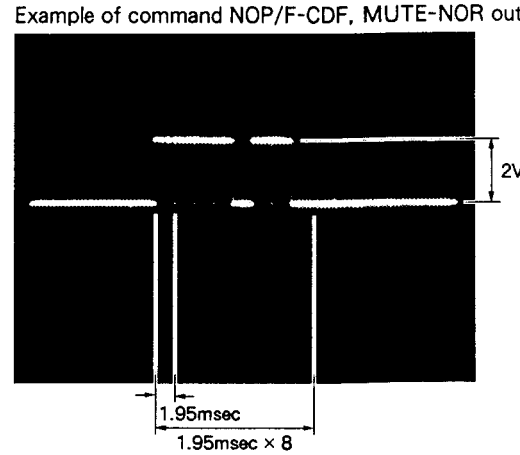

Communication with CD microcomputer (PD4210A) in the whole
From READ to WRITE : Approx. 28ms
From WRITE to READ : Approx. 25ms




PD4209
50/60 (Pin 17) input

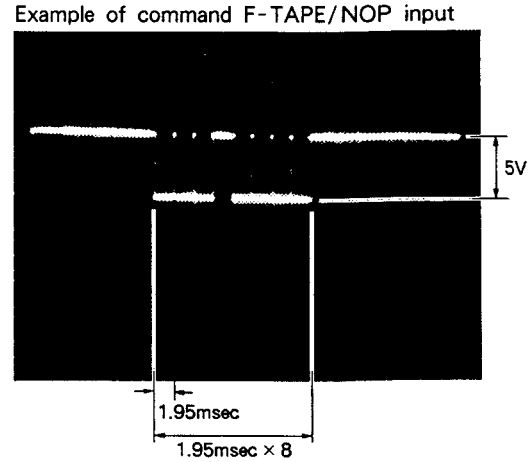



PD4209
SYSO output (Pin 41)
(All 8 bit)
Example of command NOP/F-CDF, MUTE-NOR output




PD4209
SYSI input (Pin 19)
(All 8 bit)

Example of command F-TAPE/NOP input



## 9.2 Key input and indications

### 9.2.1 Reading of the key input on the main unit

Input from keys on the main unit are read with a matrix system combining six output pins and four input pins on the expansion IC (PD0012A).

In key scanning mode, data is read when the scan output is "L". The microcomputer reads the key input at the timing of the main cycle to eliminate any affect of key chattering. And it judges that a key is pressed when it is kept depressed for a period longer than 2 cycles or 39.0 ms. When the key on the main unit is kept depressed for the specified period, the PD4209 accepts the key input and performs the corresponding operation.

When two keys are simultaneously pressed on the main unit, this input is ignored except in the following cases. When the SYSTEM POWER key is pressed simultaneously with another key, only the SYSTEM POWER key is accepted. When the SET/NEXT key and the + or − key are simultaneously pressed, the input is recognized as "TUNING +" or "TUNING −," respectively.
When three or more keys are simultaneously pressed, none of the key input is accepted.
The matrix for the keys on the main unit is shown in Table 9-4.

| | Input pin | | | |
|---|---|---|---|---|
| Output pin | KEYIN 3 | KEYIN 2 | KEYIN 1 | KEYIN 0 |
| KS0 | — | + | SET/NEXT | POWER |
| KS1 | TIMER SET | MEMORY | TUNER MODE | BAND |
| KS2 | (NOT USE) | WAKE SHIFT | WAKE ON/OFF | TIMER ON/OFF |
| KS3 | REPEAT | RANDOM | OPEN/CLOSE | DISPLAY |
| KS4 | PAUSE | PLAY | TRACK FWD | TRACK BACK |
| KS5 | (NOT USE) | (NOT USE) | (NOT USE) | (NOT USE) |

Table 9-4 Key matrix

### 9.2.2 Keys used in common

Some keys are used in common by the timer, tuner and CD player, depending on operation conditions. Common key uses are listed in Table 9-5.

| Key name | In the Timer | In the Tuner | In the CD |
|---|---|---|---|
| + | TIME + | PRESET + | (DON'T CARE) |
| − | TIME − | PRESET − | (DON'T CARE) |
| DISPLAY | (DON'T CARE) | Clock←→Frequency display | Time display switch |
| + & SET/NEXT | (DON'T CARE) | TUNING + | (DON'T CARE) |
| − & SET/NEXT | (DON'T CARE) | TUNING − | (DON'T CARE) |
| BAND | (DON'T CARE) | Band switch | CD→Tuner |
| PLAY | (DON'T CARE) | Tuner→CD | PLAY |

Table 9-5 Common of the main unit keys

### 9.2.3 Functions of the keys on the main unit

Functions of the main unit keys are shown in Table 9-6.

| Key designation | Functions |
|---|---|
| POWER | Turns on the system power or sets the system in the standby condition.<br>When power is turned on after initializing, tuner mode is selected. In other cases, the last-memory function selects the mode, tuner or CD, which has been previously selected. |
| TIMER SET | Sets the system in a mode to select the timer function to be set or to be confirmed. When the key is pressed again, the previous condition is resumed. |
| TIMER ON/OFF | Toggles the operation setting among "TIMER", "TIMER REC" and "OFF."<br>→ "TIMER" → "TIMER REC" → "OFF" → |
| WAKE ON/OFF | Toggles the operation setting among "WAKE UP" or "WAKE UP SHIFT" and "OFF."<br>→ "WAKE UP (WAKE UP SHIFT)" → "OFF" → |
| WAKE SHIFT | Enters the wake-up shift setting mode. |
| DISPLAY | Switches the clock and frequency displays in tuner mode.<br>Changes the CD time indication in the CD mode.<br>Enters the clock adjustment mode when kept depressed for more than 3 seconds when power is off or in tuner mode. |
| +/− | Functions as "TIME +/−" in timer setting and as "PRESET +/−" in tuner mode. |
| TIME +/− | Changes the timer or clock data in timer setting or clock adjustment mode. |
| PRESET +/− | Increases or decreases the preset call number on the tuner.<br>Sets the preset number to be logged in memory in the preset memory operation. |
| SET/NEXT | Advances the timer setting or the clock adjustment to the next step by fixing the data for the current |
| SET/NEXT & +/− | Functions as "TUNING+" or "TUNING−" in tuner mode, advancing or retarding the frequency or channel. |
| TUNER MODE | FM : AUTO ⟷ MONO<br>AM : DON'T CARE<br>Switches the tuner operation modes as shown above. |
| BAND | Switches the frequency bands of the tuner.<br>Switches the system to tuner mode when depressed in CD mode. |
| MEMORY | Used for preset memory in tuner mode. |
| OPEN/CLOSE | Opens and closes the disc tray. |
| RANDOM | Activates random playback. |
| REPEAT | Toggles single-track repeat, all-track repeat and repeat OFF. |
| TRACK FWD | Searches for a track in the forward direction. |
| TRACK BACK | Searches for a track in the reverse direction. |
| PLAY | Activates playback.<br>Switches the system to CD mode when depressed in tuner mode, and then starts playback. |
| PAUSE | Toggles pause and playback modes. |
| STOP | Stops the disc rotation.<br>Switches to CD mode when depressed in tuner mode. |

Table 9-6 Functions of the keys on the main unit

### 9.2.4 Remote control signal receiving

- Pioneer universal remote control codes are accepted. Each remote control signal is composed of a leader code to indicate the beginning of a signal, an 8-bit custom code to show the attributes of the signal and an 8-bit data code to show the information of the signal. The custom code and data code are accompanied by respective reversed codes. Thus, a signal includes 32 bits in total. Therefore, when decoding a remote control signal, all 32 bits (hereinafter referred to as "1 wave") are read to constantly check the validity of the custom code and data code.

| Leader code | Custom code | $\overline{\text{Custom code}}$ | Data code | $\overline{\text{Data code}}$ |
|---|---|---|---|---|
| | 8 Bit | 8 bit | 8 bit | 8 bit |

- Remote control signals are judged to be continuous when only one wave is missed. They are judged to be discontinuous when two or more waves are missed.
- Signals from the remote control unit cannot be accepted while any key on the main unit is being pressed.

The acceptable remote control codes are listed in Table 9-7. The left two digits correspond to the custom code and the right two digits correspond to the data code. Codes other than those listed in this table are not accepted.

| Key designation | Code (HEX) | Functions (Operation in receiving) | Key designation | Code (HEX) | Functions (Operation in receiving) |
|---|---|---|---|---|---|
| 10/22<br>[0/10] | A4 00<br>A2 00 | Call the preset 10/22 of the Tuner.<br>CD 0/10 key | DISPLAY | A4 4A<br>A2 43 | Refer to Table 9 – 6. |
| 1/13<br>[1] | A4 01<br>A2 01 | Call the preset 1/13 of the Tuner.<br>CD 1 key | TUNING + | A4 56 | Up the frequency or channel. |
| | | | TUNING – | A4 57 | Down the frequency or channel. |
| 2/14<br>[2] | A4 02<br>A2 02 | Call the preset 2/14 of the Tuner.<br>CD 2 key | SYSTEM POWER ON | A5 1A | Turn the system power ON. |
| | | | SYSTEM POWER OFF | A5 1B | Turn the system power OFF. |
| 3/15<br>[3] | A4 03<br>A2 03 | Call the preset 3/15 of the Tuner.<br>CD 3 key | SYSTEM POWER ON/OFF | A5 1C | Turn the system power ON/OFF. |
| 4/16<br>[4] | A4 04<br>A2 04 | Call the preset 4/16 of the Tuner.<br>CD 4 key | SLEEP | A5 48 | Set the sleep timer.<br>→90 →60 →30 →OFF → |
| 5/17<br>[5] | A4 05<br>A2 05 | Call the preset 5/17 of the Tuner.<br>CD 5 key | | | |
| 6/18<br>[6] | A4 06<br>A2 06 | Call the preset 6/18 of the Tuner.<br>CD 6 key | REPEAT | A2 0C/44 | CD REPEAT Key |
| | | | PGM | A2 0D/4C | CD PROGRAM key |
| 7/19<br>[7] | A4 07<br>A2 07 | Call the preset 7/19 of the Tuner.<br>CD 7 key | CUE | A2 0E/58 | CD CUE key |
| | | | REVIEW | A2 0F/59 | CD REVIEW key |
| 8/20<br>[8] | A4 08<br>A2 08 | Call the preset 8/20 of the Tuner.<br>CD 8 key | TRACK FWD | A2 10 | CD TRACK FWD key |
| | | | TRACK BACK | A2 11 | CD TRACK BACK key |
| 9/21<br>[9] | A4 09<br>A2 09 | Call the preset 9/21 of the Tuner.<br>CD 9 key | STOP | A2 16 | CD STOP key |
| | | | PLAY | A2 17 | CD PLAY key |
| PRESET+(TIME+) | A4 10 | Refer to Table 9 – 6. | PAUSE | A2 18 | CD PAUSE key |
| PRESET-(TIME-) | A4 11 | Refer to Table 9 – 6. | CLEAR | A2 45 | CD CLEAR key |
| BAND | A4 13 | Refer to Table 9 – 6. | CHECK | A2 49 | CD CHECK key |
| 11/23<br>[+10] | A4 46<br>A2 52 | Call the preset 11/23 of the Tuner.<br>CD +10 key | RANDOM | A2 4A | CD RANDOM key |
| | | | AUTO/COMPU | A2 4B | CD AUTO/COMPU key |
| 12/24<br>[≧20] | A4 47<br>A2 56 | Call the preset 12/24 of the Tuner.<br>CD ≧20 key | OPEN/CLOSE | A2 51 | CD OPEN/CLOSE key |
| | | | ESC CODE *1 | A4 5F | Enter the Tuner test mode. |

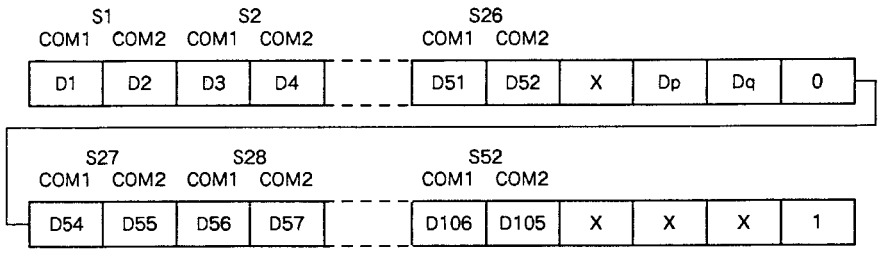
Note : *1 : ESC code is not output in the generally remote control commander.

Table 9-7 Table of the acceptable remote control codes.

### 9.2.5 Displays

Displays in the LCD block are lit by an AC driving system composed of 2 common sets of 52 segments. Drive signals for the displays are directly supplied from the LCD driver (LC7582).

The data to be transmitted to the LCD driver are shown in Fig. 9-2. Fig. 9-3 is the timing chart of the transfer.


S1 S2 S26
COM1 COM2 COM1 COM2 COM1 COM2
D1 D2 D3 D4 D51 D52 X Dp Dq 0
S27 S28 S52
COM1 COM2 COM1 COM2 COM1 COM2
D54 D55 D56 D57 D106 D105 X X X 1

D1~D105 : Display data
(0 : Light goes off, 1 : Light up)
Dp : Selection bit of the drive form
(0 : 1/1DUTY, 1 : 1/2DUTY)
Dq : Selection bit of AD and DSP functions.
(0 : segment output,
1 : AD and DSP functions)
X : DON'T CARE

※ Perform the transfer of 112 bits in all.

Fig. 9-2 Data to be transmitted to the LCD driver

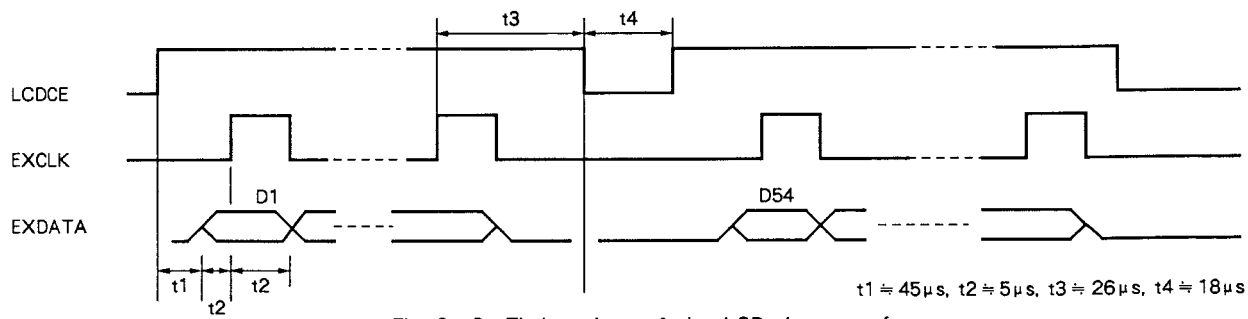
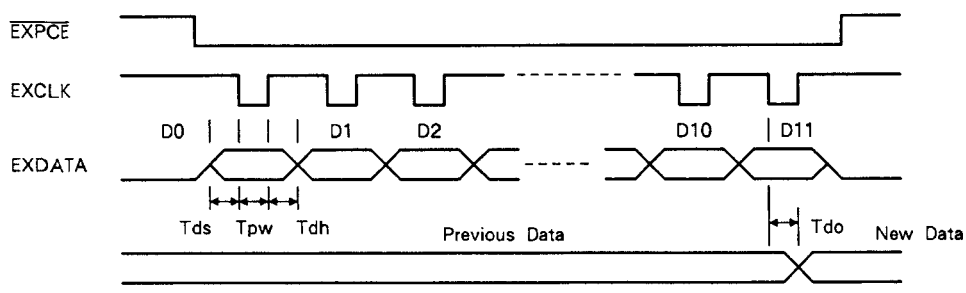



Fig. 9-3 Timing chart of the LCD data transfer

Three LEDs are employed for the displays and are driven by the output expansion IC (PD0012A). Indications of the LEDs are shown in Table 9-8. Fig. 9-4 is the timing chart for data transfer to the output expansion IC (PD0012A).

| Designatioon of LED | Indication |
|---|---|
| STAND-BY | Lights in power STANDBY state and goes off when the power is turned on. |
| TUNER | Lights when the power is on in tuner mode and goes off in CD mode and in power STANDBY state. |
| PLAY | Lights during playback in CD mode and flashes in pause mode. |

Table 9-8 LED indications




Tds ≒ 5μs, Tpw ≒ 20μs,
Tdh ≒ 20μs, Tdo ≧ 10μs
※ Output will be OFF when Dn = 0.
Output will be ON when Dn = 1.

Fig. 9-4 Timing chart for data transfer to the PD0012A

## 9.3 Power control

### 9.3.1 Power ON/OFF control

As UNSW5V power is supplied to the PD4209, it is always operable as long as the power cord of the system is connected to a power outlet, and it controls the system power ON/OFF, tuner power ON/OFF and CD microcomputer (PD4210A) reset.

The mode shifts of power ON/OFF operations are shown in Fig. 9-5.

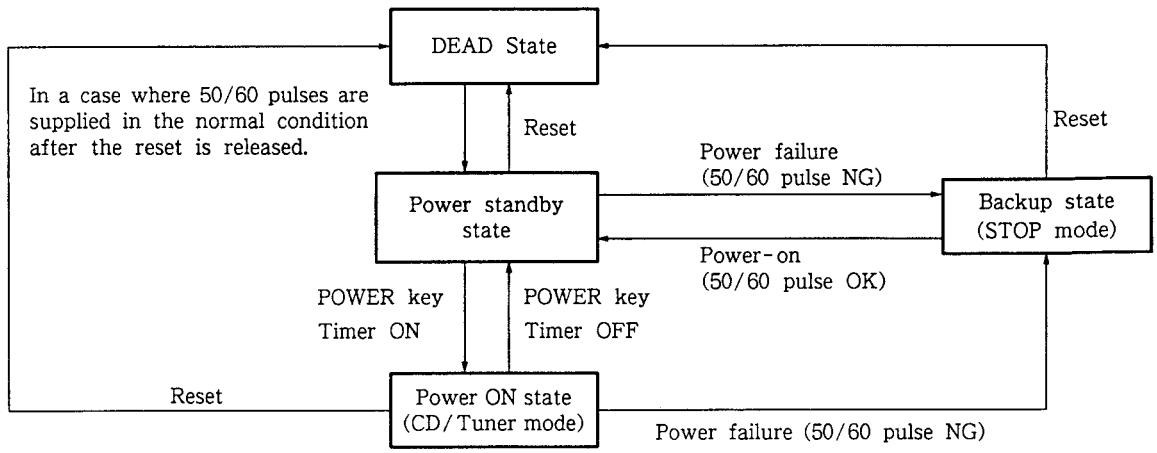

DEAD State
In a case where 50/60 pulses are supplied in the normal condition after the reset is released.
Reset
Reset
Power failure (50/60 pulse NG)
Power standby state
Backup state (STOP mode)
Power-on (50/60 pulse OK)
POWER key Timer ON
POWER key Timer OFF
Reset
Power ON state (CD/Tuner mode)
Power failure (50/60 pulse NG)

Fig. 9-5 Mode shifts of power ON/OFF operations

### 9.3.2 Measurement of 50/60 pulses

When the power cord is connected to an outlet and reset of the PD4209 system microcomputer is released, the initial settings are performed and the power (50/60 Hz) being supplied is checked for normal condition for about 1.5 seconds.

If the power check is satisfactory, the fixed data in RAM are checked. When the data have not been destroyed, all the data except the tuner preset data and time data for power failures are cleared. If destroyed, all the RAM data are cleared as the RAM data are judged to be unfixed. Then, the key scanning and decoding processes of remote control signals are initiated and the system enters normal power STANDBY state. The power standby LED lights and the time indication blinks.

The check timing at power-on is shown in Fig. 9-6.

**① Power check**

Judged as OK when 40 to 71 rising edges (41 – 71 Hz) are counted during 0.5 seconds after 50/60 pulses start generating. If this OK condition is observed continuously three times, the power is judged to be normal. If not, the backup cindition is retrieved and the power check is repeated from the beginning.

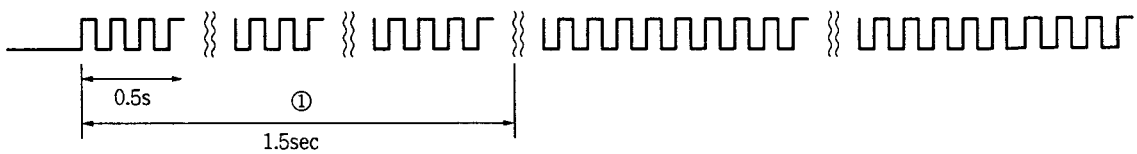



Fig. 9-6 Check timing of 50/60 Hz at power-on

### 9.3.3 Power STANDBY state

When the time has not been set, the time indication blinks. When the time has been set, the clock operates showing the current time. The clock timer in the main microcomputer (PD4209) is used for the clock operation.

Pressing the power key in power STANDBY state turns on the power.

When the timer start time is reached in power STANDBY as well as timer standby state, power is turned on, activating playback or recording.

In power STANDBY state, the current time and timer data setting can be performed.

- In power STANDBY state, the CD microcomputer (PD4210A) is in reset state and is not operating.
- While the system is shifting from power STANDBY to ON, no key input is accepted.

The timing of the shift from system power STANDBY to ON is shown in Fig. 9-7.

### 9.3.4 Power ON state

After initializing or after having resumed from backup state, tuner mode is entered when power is turned on. In other cases, either tuner or CD mode is entered depending on the previous setting by the last-memory function.

When starting a timer playback, CD mode is entered. For timer recording, tuner mode is entered.

When the PLAY or STOP key is pressed in tuner mode, CD mode is entered. When the BAND key is pressed in CD mode, tuner mode is entered.

When the POWER key is pressed in power ON state or when a timer operation is completed, the system enters in power STANDBY state.

When shifting the state from power ON to STANDBY, the system closes the trays of the CD player and the tape deck, checks that the disc rotation and the mechanism have stopped, and then turns off the power. (If the deck is not connected in the system, the tray of the deck is not closed and the mechanism does not stop.)

- While the system is shifting from power ON to STANDBY, from tuner mode to CD mode or vice versa, no key input is accepted.
- Communication with the CD microcomputer (PD4210A) is possible even in tuner mode and the tray can be opened or closed with the power for tray loading control

The timing of the shift from power ON to STANDBY is shown in Fig. 9-8.

The timing of the shift from tuner mode to CD mode is shown in Fig. 9-9.

The timing of the shift from CD mode to tuner mode is shown in Fig. 9-10.

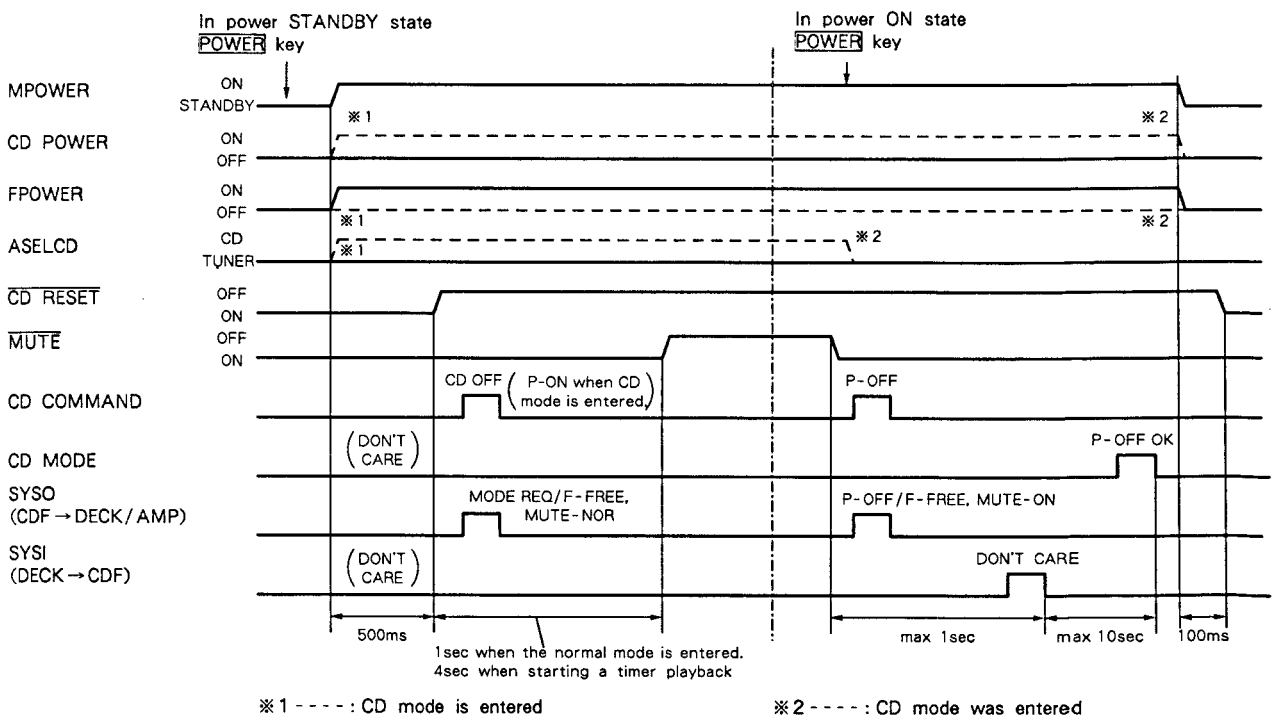



Fig. 9-7 Timing of the shift from system power STANDBY to ON.

Fig. 9-8 Timing of the shift from system power ON to STANDBY

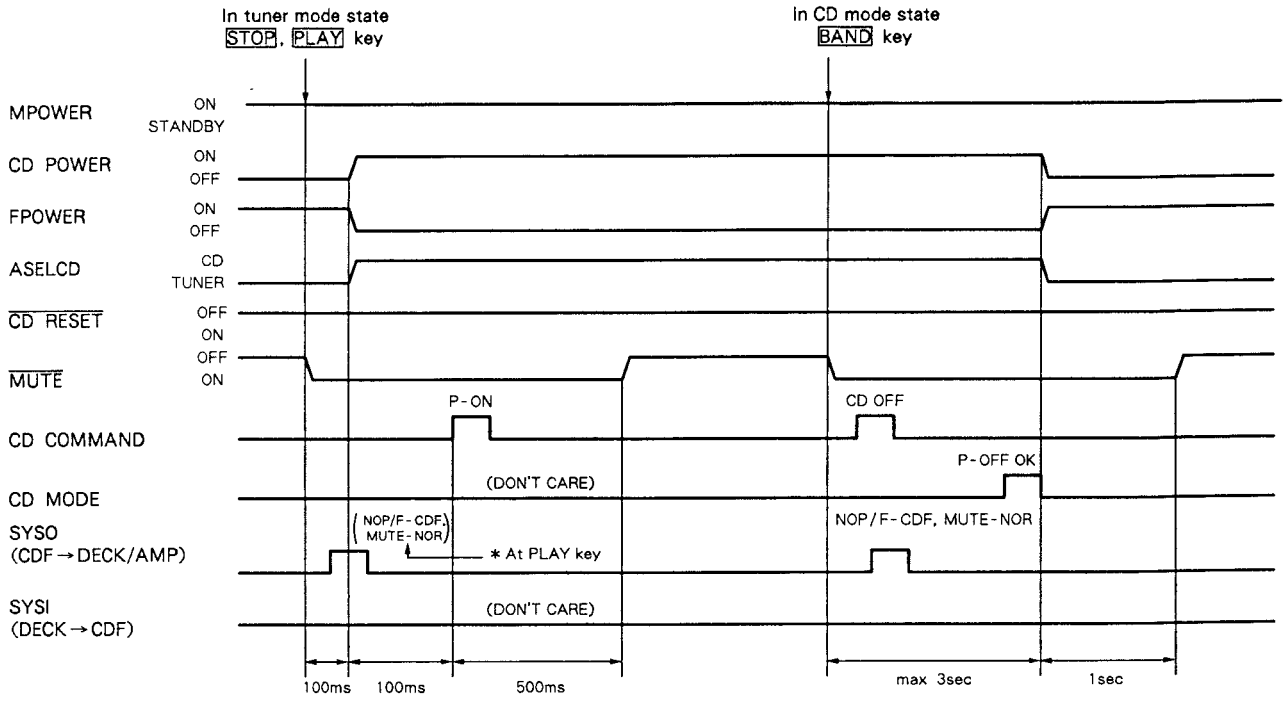



Fig. 9-9 Timing of the shift from TUNER mode to CD mode

Fig. 9-10 Timing of the shift from CD mode to TUNER mode

### 9.3.5 Backup state

When no pulse is applied to the 50/60 input terminal for more than 31.2 ms due to a power failure, etc., the system shifts to backup state.

Fig. 9-11 shows the timing of generation of backup state.

In backup state, the system clock of the PD4209 is stopped (STOP mode), the software pull-up is turned OFF and the ports are set in input (high-impedance) state to maintain the RAM data.

Even during a power failure, BKUP5V generated by the supercapacitor is supplied to the CPU, maintaining the RAM data for several days.

- In backup state, no key input either from the main unit or the remote control unit is accepted.
- In backup state, the clock does not advance.
- The timer settings are cleared when the system enters backup state.

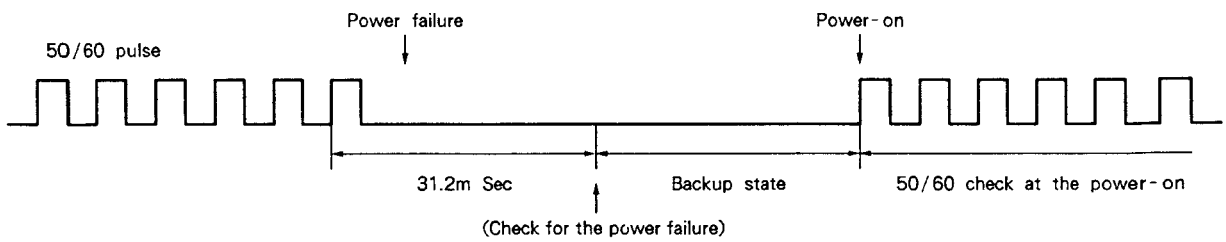



Fig. 9-11 Timing of generation of backup state

## 9.4 Timer functions

- The following four timer functions are available.

① TIMER REC : Timer recording (ONCE)
② TIMER : Timer playback (ONCE)
③ WAKEUP (EVERY) / WAKE UP SHIFT (ONCE) : Timer playback
④ SLEEP : Sleep timer

### 9.4.1 Timer operations

**1. Timer playback operations : TIMER, WAKE UP (SHIFT)**

The timer playback features an automatic source selecting function. This function automatically selects the playback source for the timer operation in the sequence from CD to tape to tuner. If a compact disc is available when the timer is activated, the disc is played back. When no disc but a tape is available, the tape is played back. If neither disc nor tape is available, the station set by the timer is tuned. The function of the amplifier is also automatically selected when the playback source is determined. *

* Only when all the "SOIGNE" system connections have been made.

- When no tape deck is connected or when the power of the connected deck is turned off, the tape playback is not made.

Power is turned off at the timer off time.
Fig. 9-12 includes the timing charts of the power shifts and system and CD commands when the timer playback is activated.

**2. Timer recording operation : TIMER REC**

Activates the system at the timer recording ON time, tuning in the specified station on the tuner and starting recording on the deck. The program to be recorded is selected only on the tuner.
During timer recording, the function of the amplifier is locked to CD/TUNER and command muting is activated until the recording stops at the end of the tape or is stopped manually. When the deck stops, the function lock and timer recording are cleared and power is turned off.
When timer recording cannot be started for some reason, such as no tape being available or a tape being played on the deck, power is turned off after about 9 seconds and timer recording is cleared. Command muting is active until the power is turned off.
Fig. 9-13 includes the timing charts of the power shift and system commands when timer recording is activated.

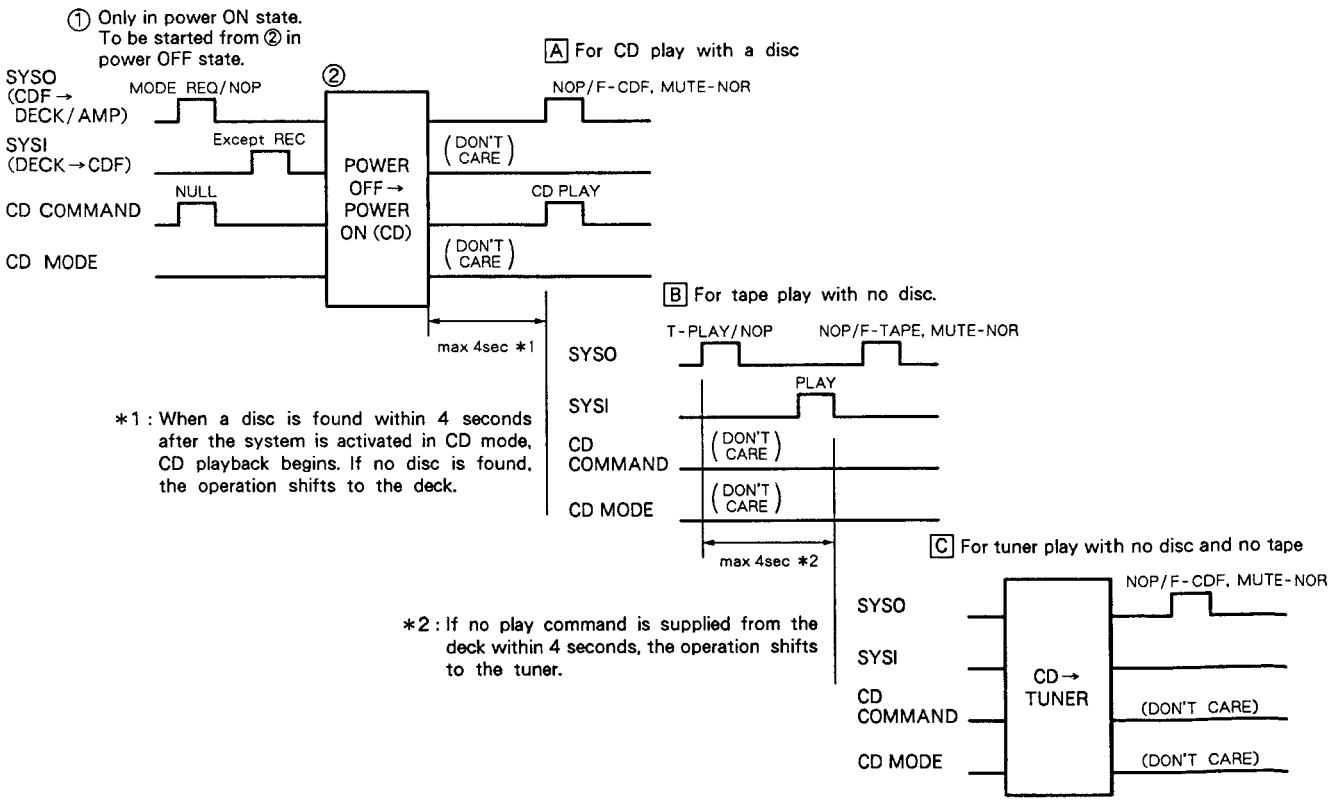
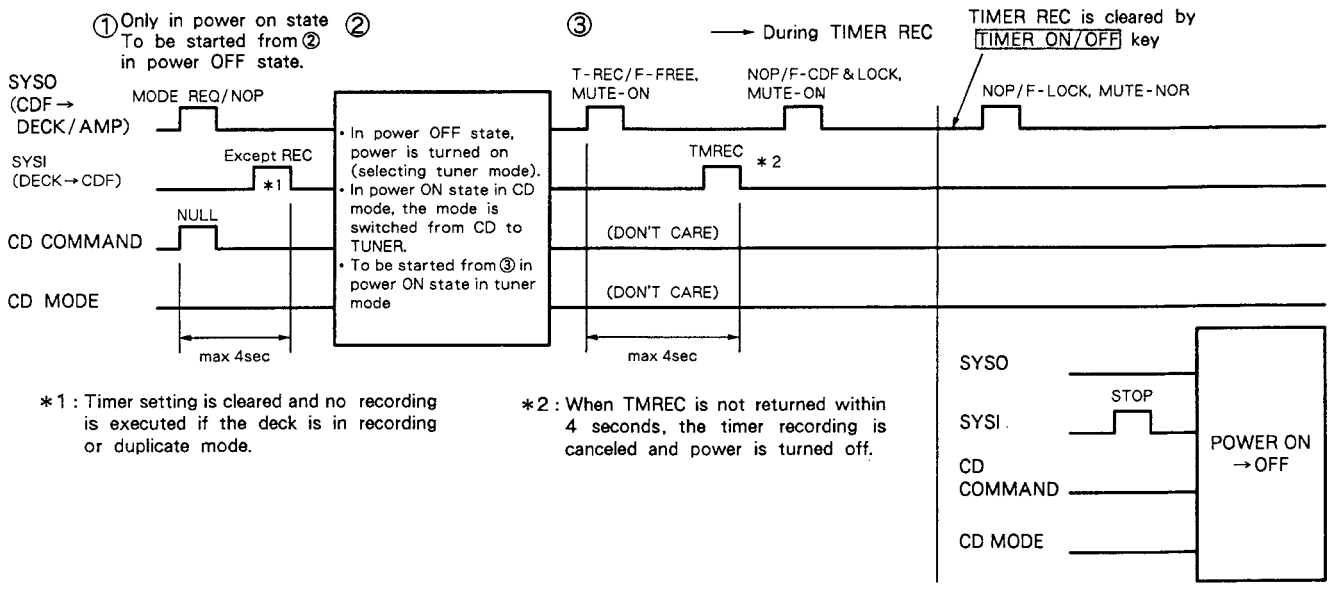

① Only in power ON state.
To be started from ② in power OFF state.
A For CD play with a disc
SYSO (CDF→ DECK/AMP)
MODE REQ/NOP
NOP/F-CDF, MUTE-NOR
SYSI (DECK→CDF)
Except REC
DON'T CARE
POWER OFF→ POWER ON (CD)
CD COMMAND
NULL
CD PLAY
CD MODE
DON'T CARE
max 4sec *1
B For tape play with no disc.
T-PLAY/NOP
NOP/F-TAPE, MUTE-NOR
SYSO
SYSI
PLAY
CD COMMAND
DON'T CARE
CD MODE
DON'T CARE
max 4sec *2
C For tuner play with no disc and no tape
NOP/F-CDF, MUTE-NOR
SYSO
SYSI
CD COMMAND
CD MODE
CD→ TUNER
(DON'T CARE)
(DON'T CARE)
*1 : When a disc is found within 4 seconds after the system is activated in CD mode, CD playback begins. If no disc is found, the operation shifts to the deck.
*2 : If no play command is supplied from the deck within 4 seconds, the operation shifts to the tuner.

Fig. 9-12 System communication when the timer playback is activated




*1 : Timer setting is cleared and no recording is executed if the deck is in recording or duplicate mode.

*2 : When TMREC is not returned within 4 seconds, the timer recording is canceled and power is turned off.

Fig. 9-13 System and CD communication when the timer recording is activated

## 9.5 Tuning control on the tuner

### 9.5.1 Tuning operation on the tuner

The tuner can receive FM and AM bands.
The receivable frequencies are shown in Table 9-9.

KU type

| Band | Frequency |
|---|---|
| FM | 87.5 – 108 MHz (0.1 MHz step) |
| AM | 530 – 1700 kHz (10 kHz step) |

HEI and HB types

| Band | Frequency |
|---|---|
| FM | 87.5 – 108 MHz (50 kHz step) |
| MW | 531 – 1602 kHz (9 kHz step) |
| LW | 153 – 281 kHz (1 kHz step) |

Table 9-9 Receivable frequencies

- For each band, the frequency to be tuned can be increased or decreased with the TUNING +/− keys (or the SET/NEXT & +/− keys on the main unit).

When the TUNING + or − key is pressed for more than 1 second, the step-by-step tuning is set to medium speed (advancing 1 step every approx. 0.3 second). When releasing the TUNING + or − key within 1.2 seconds, auto tuning mode is activated.
In auto tuning mode, the microcomputer continues the TUNING +/− operation until a station is found. When a station is tuned in, the tuning operation stops at that frequency. (This auto tuning function is not effective for LW stations.)
When the TUNING +/− key is held down for more than 1.2 seconds while step-by-step tuning is operating at medium speed, automatic tuning mode is released, and the step-by-step tuning is performed at high speed (advancing 1 step about every 0.1 second) until the TUNING +/− key is released.
Fig. 9 – 14 shows the timing to increase (UP) the frequency when the TUNING + key is pressed. (When the TUNING − key is used, the operation is also performed with the same timing.)

- When a station is found in FM tuning, muting is activated for about 290 ms and then released. When no station is found in AUTO mode, muting is kept activated, In MONO mode. muting will be released in about 290 ms whether a station is found or not.
- In AM tuning, muting is activated for about 290 ms and released when a station is found.
- In FM reception, AUTO and MONO can be toggled with the TUNER MODE key.

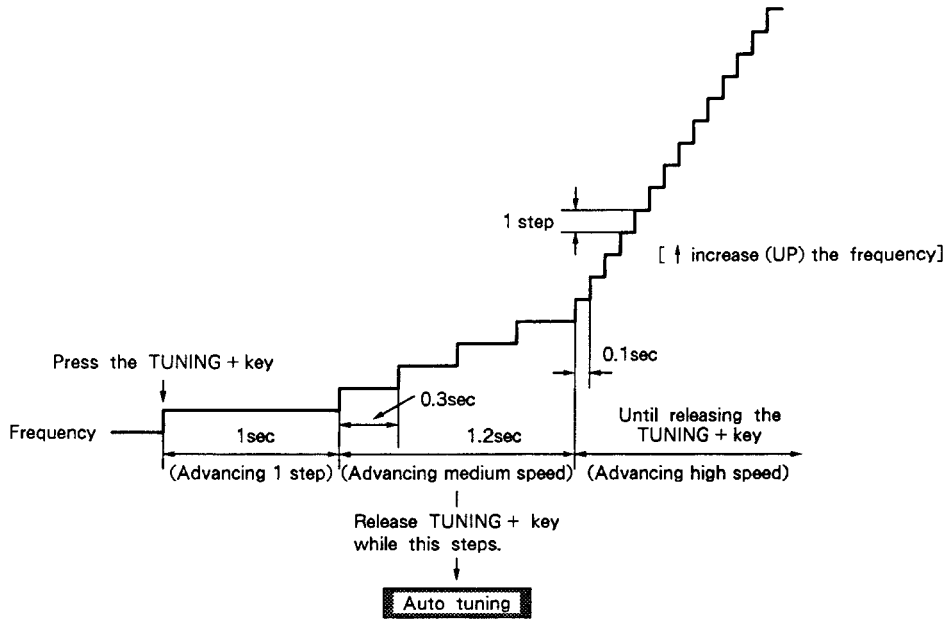



Fig. 9 - 14 Timing to increase (UP) the frequency when the TUNING + key is pressed

### 9.5.2 Data transfer to the tuner unit

FM and AM frequency selection is controlled by sending serial data to the PLL frequency synthesizer in the tuner unit.

The data transmission mode is determined by the 4-bit data to be sent when CE is "L". The 36-bit data to be sent after CE is set to "H" will be data for the prescaler. The data is sent in the sequence beginning from the least-significant bit (LSB), which determines the frequency to be tuned.

The IC reads the data at the rising edge of the clock. The all-bit transmission mode (mode 1) is always used. Fig. 9-15 shows the data transfer timing.

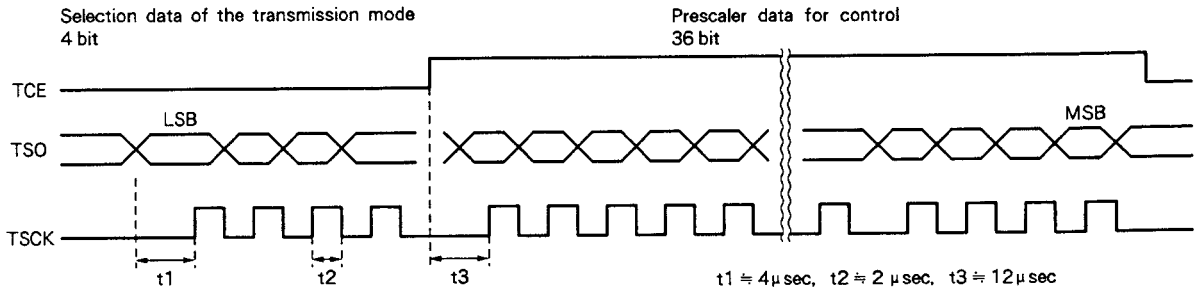



Fig. 9-15 Serial data transfer timing to the tuner

#### 1. Functions of the control data

Fig. 9-16 shows the functions of the control data.

LSB

| D0 | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | D11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D12 | D13 | D14 | D15 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | CTEN |

MSB

| R0 | R1 | R2 | R3 | DV | SP | SC | SF | GT | TB | T0 | T1 |
|---|---|---|---|---|---|---|---|---|---|---|---|

D0~D15 : Programmable divider data
00~06 : Output port data
CTEN : Start data of the general-purpose counter
R0~R3 : Reference frequency data
DV : Divider selection data
SP : Sensitivity selection data
SC : Input terminal selection data of the general-purpose counter
SF : Frequency and cycle switching data of the general-purpose counter
GT : Count time selection data of the general-purpose counter
TB : Time base output data
T0,T1 : LSI test data

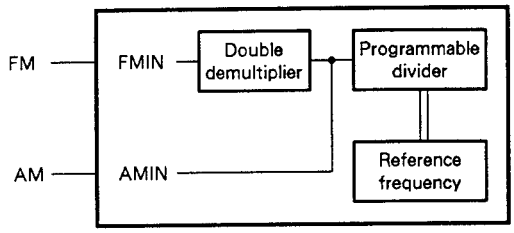
※CTEN, SC to T1 are set to "0" as the general-purpose counter is not used.

Fig. 9-16 Functions of the control data

(1) Functions of the output port data

| Type | 06 | 05 | 04 | 03 | 02 | 01 | 00 |
|---|---|---|---|---|---|---|---|
| KU | $\overline{FM}$ | — | — | $\overline{AM}$ | — | — | — |
| HEI, HB | $\overline{FM}$ | — | — | $\overline{MW}$ | — | — | $\overline{LW}$ |

(2) Demultiply condition of the local oscillation input




(3) Reference frequency data and the SP and DV setting.

KU type

| | R3 | R2 | R1 | R0 | Reference frequency | SP | DV | Input pin |
|---|---|---|---|---|---|---|---|---|
| FM | 1 | 0 | 0 | 0 | 50 kHz | 0 | 1 | FMIN |
| AM | 0 | 0 | 0 | 1 | 10 kHz | 0 | 0 | AMIN * |

HEI and HB types

| | R3 | R2 | R1 | R0 | Reference frequency | SP | DV | Input pin |
|---|---|---|---|---|---|---|---|---|
| FM | 0 | 1 | 0 | 0 | 25 kHz | 0 | 1 | FMIN |
| MW | 1 | 0 | 0 | 1 | 9 kHz | 0 | 0 | AMIN * |
| LW | 1 | 1 | 0 | 1 | 1 kHz | 0 | 0 | AMIN * |

* : When (DV, SP) = (0,0), D0 through D3 are ignored (set to "DON'T CARE"). The 12 bits of D4 through D16 are effective for the divider data.

## 9.6 System communication and system functions

For the timer operations, automatic functions or ASES (automatic synchronous editing system), serial communication is performed between the CD/TUNER, DECK and AMP units.
Fig. 9-17 shows the connections for communication.

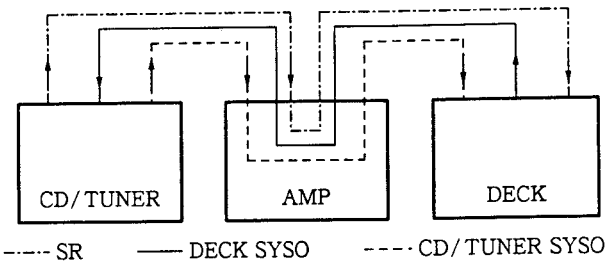



Fig. 9-17 Connection for the system communication

- Special control cables are used for the connections.
- GND can be commonly connected by using an audio phono cable.
- SR is accepted at the CD/TUNER unit and sent to the AMP and DECK units as is and is decoded by item
- The amplifier does not output commands but only receives commands from the CD/TUNER unit.
- The CD/TUNER unit receives and analyzes commands from the DECK unit and sends the necessary commands to the AMP and DECK units.

### 9.6.1 System communication format

The format of the system communication is shown in Fig. 9-18.

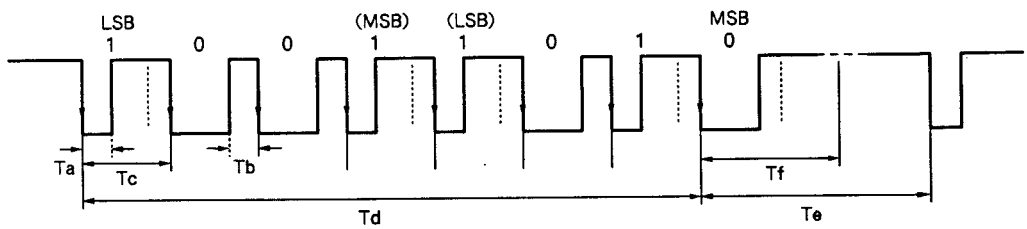



Fig. 9-18 Format of the system communication

Time restrictions are shown in Table 9-10.

| | Min | Typ | Max | Unit |
|---|---|---|---|---|
| Ta | 10 | 10 | 15 | μsec |
| Tb | — | 20 | 200 | μsec |
| Tc | 1.4 | 1.95 | 4.1 | msec |
| Td | | Tc × 7 | | — |
| Te | Tc × 16 | Tc × 20 | Tc × 24 | — |
| Tf | | Tc × 4 | | — |

Table 9-10 Time restrictions of the communication format

Fig. 9-19 shows the allocation of the commands sent from the CD/TUNER unit to the DECK and AMP units and of commands sent from the DECK unit to the CD/TUNER unit

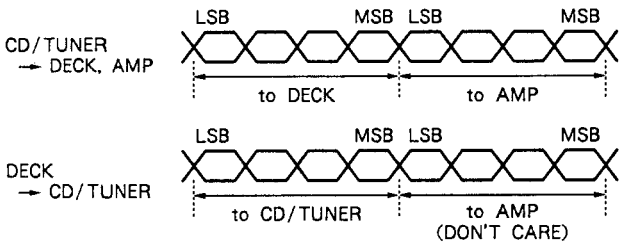



Fig. 9-19 Allocation of the commands

- The command is composed of 4 bits for each item or of 8 bits in total and is sent from the LSB.
- A command bit is read at a falling edge. When it is "L" after about 30μsec, it is regarded as "0," When it is "H", it is regarded as "1."
- When the data supplied at the end of Tf contains 8 bits, the command check judges it to be effective as a command.
- Commands are output only when required.
- A command is sent once. It is not sent repeatedly.

The commands are listed in Table 9-11.

| Command | CDF→AMP | CDF→DECK | DECK→CDF |
|---|---|---|---|
| 0 (F) | NOP | NOP | NOP |
| 1 (E) | (DUMMY) | POWER-OFF [F-FREE MUTE-ON] | (DUMMY) |
| 2 (D) | (DUMMY) | TIMER-REC | (DUMMY) |
| 3 (C) | (DUMMY) | TIMER-PLAY | MECHA-TREC [F-LOCK MUTE-ON] |
| 4 (B) | F-LOCK MUTE-ON | MODE REQEST | MECHA-STOP [F-FREE MUTE-NOR] |
| 5 (A) | F-FREE MUTE-ON | (DUMMY) | MECHA-PLAY [F-FREE MUTE-NOR] |
| 6 (9) | F-LOCK MUTE-NORMAL | (DUMMY) | MECHA-REC [F-LOCK MUTE-NOR] |
| 7 (8) | F-FREE MUTE-NORMAL | (DUMMY) | MECHA-DON'T CARE [F-FREE MUTE-NOR] |
| 8 (7) | F-TAPE & FREE MUTE-NORMAL | (DUMMY) | F-TAPE [F-TAPE & FREE MUTE-NOR] |
| 9 (6) | F-CDF & FREE MUTE-NORMAL | (DUMMY) | (DUMMY) |
| A (5) | (DUMMY) | SYNCRO-STOP | SYNCRO-STOP [F-FREE MUTE-NOR] |
| B (4) | (DUMMY) | PEAK START (FINE) | (DUMMY) |
| C (3) | F-CDF & LOCK MUTE-ON | PEAK START (NOT FINE) | SYNCRO-START |
| D (2) | F-CDF & LOCK MUTE-NORMAL | PEAK-END | SYNCRO-REC |
| E (1) | (DUMMY) | (DUMMY) | SYNCRO-TAPE END |
| F (0) | (DUMMY) | (DUMMY) | (DUMMY) |

( ) indicates the port output

The MUTE ON command activates command muting mode. Manual muting mode is resumed with MUTE NORMAL. Command muting is forcibly released with a manual mute operation or power ON/OFF operation. which activates manual muting.

Table 9-11 System command list

### 9.6.2 Automatic function control

Switches the function to CD/TUNER or TAPE respectively when the PLAY key or BAND key on the CD/TUNER unit or the PLAY key on the DECK unit is pressed.

When the DECK unit is in manual recording, the function is locked until a mode other than recording is activated.

### 9.6.3 ASES control

When a disc is set in the CD/TUNER unit which is in stop state in CD mode and a tape is also available in the DECK unit which is in the stop state (ready for recording), the ASES (synchronous recording) can be activated with the ASES key on the remote control unit.

When the ASES is activated, the recording level is automatically adjusted with peak search, and then synchronous recording starts. The ASES is stopped by pressing the CD STOP, DECK STOP or POWER key, or with automatic stopping of the CD or DECK unit.

- The ASES cannot be activated in input tuner mode.
- During an ASES operation, no key other than POWER, STOP or DISPLAY keys is accepted.
- When the ASES is activated, the function is locked to CD/TUNER.
- Command muting is activated during a peak search operation.
- When the timer-operation start time is reached during an ASES operation, the timer setting is cleared and the timer operation is not performed.
- If the ASES is activated during a timer operation, power will be turned off at the timer-OFF time unless the timer operation is canceled.
- The sleep timer can be set even during an ASES operation.
- During timer data setting, the ASES cannot be activated.

The command controls for ASES operation are shown in Fig. 9-20.

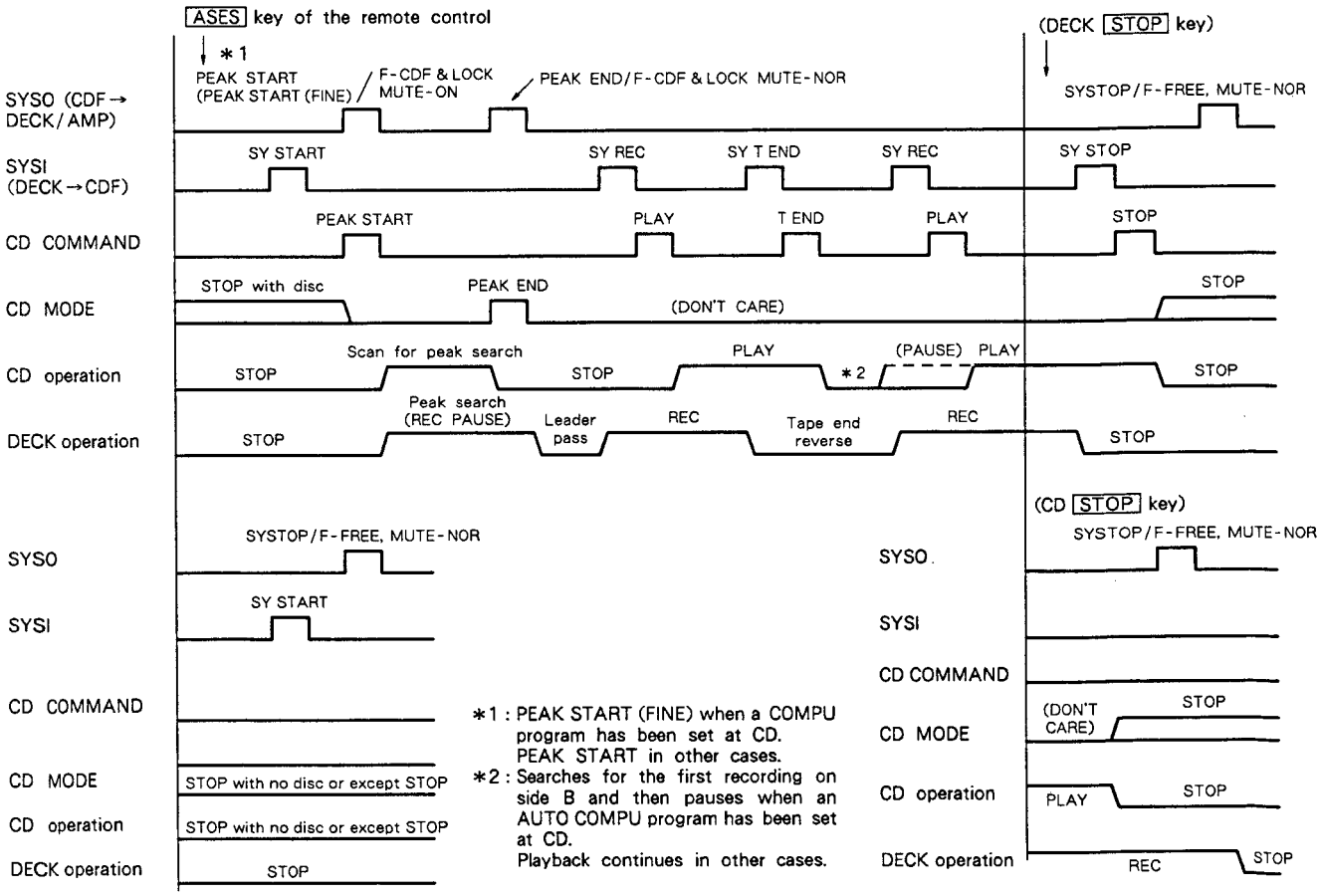



Fig. 9-20 System and CD communications for ASES operation

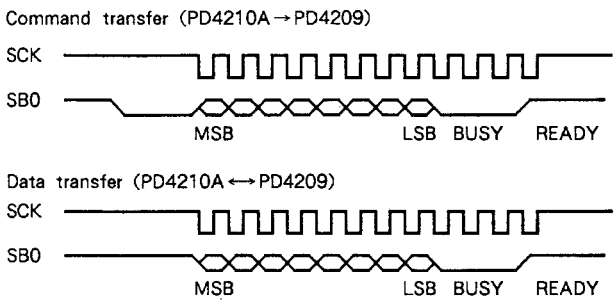
## 9.7 Communication with the CD microcomputer (PD4210A)

To send information on CD key input to the CD microcomputer (PD4210A) and to receive information on CD indications, communication is performed using two lines. The communication uses a serial interface which specifies the CD microcomputer (PD4210A) as the master and the PD4209 as the slave.

- Communication is always active except when the power is off. (It is active even in the tuner mode. For communication waveforms, see page 83.)

### 9.7.1 Communication format

In communication, data are received or sent after a command (communication control command) is sent. The command transfer and data transfer formats are shown in Fig. 9-21.




※ The clock is always output from the CD microcomputer (PD4210A)

Fig. 9-21 Transfer format

### 9.7.2 Communication sequence

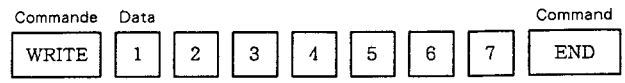
The command is shown in Table 9-12.

| Command | CODE (HEX) | Functions |
|---|---|---|
| WRITE | 11 | Start the data transfer from CD to main. (Display data and CD mode data) |
| READ | 22 | Start the transfer from main to CD. (Key data and CD command) |
| END | 00 | End of the data transfer. |

Table 9-12 SBI command list

The communication sequence is shown in Fig. 9-22.

- WRITE operation




- READ operation

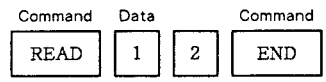



Fig. 9-22 Communication sequence

- When an END command is received in a WRITE operation, a checksum is performed on the received data. When there are 7 bytes of data and the checksum is satisfied, the data are accepted. If either of these requirements is not satisfied, the data are not accepted.
- When an END command is received in a READ operation, the number of sent data is checked. If 2 bytes of data are counted, the check is passed.
- The WRITE and READ operations are alternately performed for every single main routine of the CD microcomputer (PD4210A).

### 9.7.3 Description of communication data

The data to be sent to the CD microcomputer (PD4210A) are described in Table 9-13 and data to be received from the CD microcomputer (PD4210A) are described in Table 9-14.

| BYTE | 3 | 2 | 1 | 0 |
|---|---|---|---|---|
| (1) | KEY DATA (LOWER) | | | |
| | KEY DATA (UPPER) | | | |
| (2) | CD COMMAND | | | |
| | CHECK SUM * | | | |

* Obtained by adding KEY DATA and CD command with carry.

Table 9-13 Transfer data from PD4209 to PD4210A (in READ operation)

| BYTE | 3 | 2 | 1 | 0 |
|---|---|---|---|---|
| (1) | STEP | TRACK | TOTAL | REMAIN |
| | With DISC | PLAY | PAUSE | : |
| (2) | PROGRAM | RANDOM | 1 - | REPEAT |
| | (A) | (B) | COMPU | EDIT |
| (3) | STEP (LOWER) | | | |
| | STEP (UPPER) | | | |
| (4) | TRACK (LOWER) | | | |
| | TRACK (UPPER) | | | |
| (5) | MINUTE (LOWER) | | | |
| | MINUTE (UPPER) | | | |
| (6) | SECOND (LOWER) | | | |
| | SECOND (UPPER) | | | |
| (7) | CD MODE | | | |
| | CHECK SUM * | | | |

* Obtained by adding 13 nibbles data with carry.

Table 9-14 Transfer data from PD4210A to PD4209 (in WRITE operation)

The CD COMMANDs are described in Table 9-15 and CD modes are described in Table 9-16.

| CD COMMAND | CODE (HEX) | CD functions |
|---|---|---|
| NULL | 0 | No operation |
| PON | 1 | Releases the servo and decoder IC reset. |
| POFF | 2 | Closes the tray and activates the stop/ servo. decoder IC reset. |
| STOP | 3 | Stops operation (timer, ASES) |
| PLAY | 4 | Begins playback (timer, ASES) |
| SYTEND | 5 | Performs the tape end operation during an ASES operation (to search for the first recording on side B, a pause, etc.) |
| PEAK START | 6 | Begins peak search scanning. |
| CD OFF | 7 | Activates the servo, decoder IC reset. |

Table 9-15 CD COMMAND list

| CD MODE | CODE (HEX) | Functions |
|---|---|---|
| DON'T CARE | 0 | Conditions other than STOP and PLAY. |
| PON OK | 1 | Operation end by a PON command. |
| POFF OK | 2 | Operation end by a POFF command. |
| STOP | 3 | Stop state. |
| PLAY | 4 | In playback. |
| PEAK END | 5 | End of peak search scanning. |

Table 9-16 CD MODE list

## 9.8 Description of tuner test mode

Tuner test mode is activated when a tuner ESC code (A45F) is input by the remote control unit in tuner mode.

In test mode, the following checks and operations are possible.

(1) TIMER SET, TIMER ON/OFF, WAKE ON/OFF and WAKE SHIFT key input checks (see to 9.8.1)

(2) Check of tuner preset data writing and preset calls (see 9.8.2).

- When test mode is activated, all the segments of PROGRAM, RANDOM, 1- and REPEAT light up indicating that test mode is activated.
- Test mode is released by turning off the power with the POWER key.

### 9.8.1 Check of the key input reception

When the TIMER SET key, TIMER ON/OFF key, WAKE ON/OFF key or WAKE SHIFT key is pressed, the PROGRAM, RANDOM, 1- and REPEAT segments light up indicating the key input is accepted.

- At this time, only the segments light up, and no operation is starated.

### 9.8.2 Test preset data

When test mode is activated, the data shown in Table 9-17 will be written in the random preset area.

KU type

| P-NO | J/EX | BAND | FREQUENCY |
|---|---|---|---|
| P-13 | EX 10k | AM | 530 kHz |
| P-14 | EX 10k | AM | 1700 kHz |
| P-15 | EX 10k | AM | 1010 kHz |
| P-16 | EX 10k | FM | 87.5 MHz |
| P-17 | EX 10k | FM | 108.0 MHz |
| P-18 | EX 10k | FM | 99.0 MHz |

• When checking the preset data, use P-13 through P-18.

HEI and HB types

| P-NO | J/EX | BAND | FREQUENCY |
|---|---|---|---|
| P-10 | EX | LW | 153 kHz |
| P-11 | EX | LW | 281 kHz |
| P-12 | EX | LW | 254 kHz |
| P-19 | EX 9k | MW | 531 kHz |
| P-20 | EX 9k | MW | 1602 kHz |
| P-21 | EX 9k | MW | 1008 kHz |
| P-22 | EX 9k | FM | 87.5 MHz |
| P-23 | EX 9k | FM | 108.0 MHz |
| P-24 | EX 9k | FM | 99.0 MHz |

• When checking the preset data, use P-10 through P-12, and P-19 through P-24.

Table 9-17 Test preset data

## ■ PD4210A (IC6)

CD section microcomputer

The CD section of this unit operates according to the conditions of the unit as follows.

| FD – J7 power | CD microcomputer | CD circuit power | Tray open/close |
|---|---|---|---|
| Standby state | Reset state | OFF | Impossible |
| ON Tuner mode | Operation | OFF | Possible |
| ON CD mode | Operation | ON | Possible |

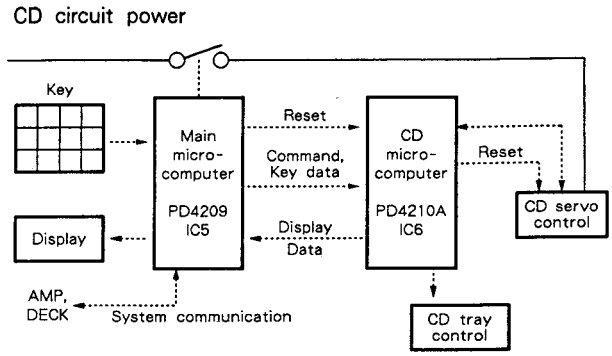



Fig. 9-23

Key input reception and display data sending are not performed directly but by communicating with the main microcomputer (PD4209). The PD4210A receives the key and command data from the main microcomputer (PD4209), performs the corresponding operations and then returns the indication data to the main microcomputer (PD4209).

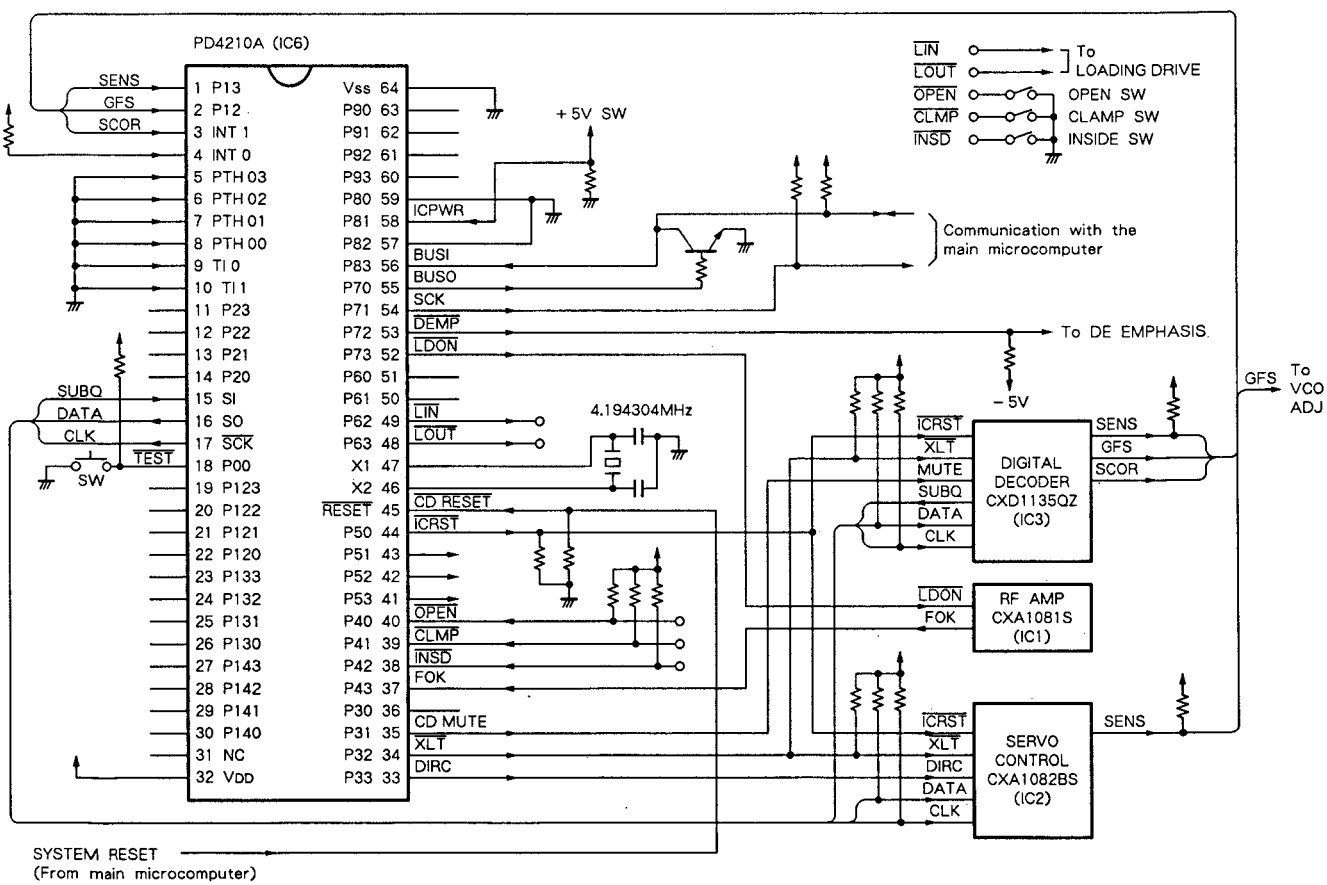



Fig. 9-24 Connection diagrm of the CD section microcomputer

| Pin | Pin name | I/O | Function | Active | Pin | Pin name | I/O | Function | Active |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SENS | I | Operation state of the LSI and other mode input | | 34 | $\overline{XLT}$ | O | Lach pulse output of LSI control data | L |
| 2 | GFS | | Frame sync lock input | H | 35 | CD MUTE | | CD muting output | H |
| 3 | SCOR | | Subcode sync input | H | 36 | N. C. | | | |
| 4 | —— | | Pull-up ($\overline{RMDT}$) | — | 37 | FOK | I | Focus OK input | |
| 5 | —— | | Connecto to GND | | 38 | $\overline{INSD}$ | | Input of slider inside SW | L |
| 6 | —— | | | | 39 | $\overline{CLMP}$ | | Input of slider clamp completion SW | L |
| 7 | —— | | | | 40 | $\overline{OPEN}$ | | Input of tray open completion SW | L |
| 8 | —— | | | | 41 | N. C. | O | | |
| 9 | —— | | | | 42 | N. C. | | | |
| 10 | —— | | | | 43 | N. C. | | | |
| 11 | N. C. | O | | | 44 | $\overline{ICRST}$ | | IC reset output | |
| 12 | N. C. | | | | 45 | $\overline{CD\ RESET}$ | I | Reset input of CD microcomputer | |
| 13 | N. C. | | | | 46 | X2 | | Clock input 4.194304MHz | |
| 14 | N. C. | | | | 47 | X1 | | | |
| 15 | SUBQ | I | Serial input of subcode Q data | | 48 | $\overline{LOUT}$ | O | Loading OUT output | L |
| 16 | DATA | O | Serial output of LSI control data | L | 49 | $\overline{LIN}$ | | Loading IN output | L |
| 17 | CLK | | Serial clock output | L | 50 | N. C. | | | |
| 18 | $\overline{TEST}$ | I | Test mode switching input | L | 51 | N. C. | | | |
| 19 | N. C. | O | | | 52 | $\overline{LDON}$ | | Laser diode ON/OFF output | L |
| 20 | N. C. | | | | 53 | $\overline{DEMP}$ | | Deemphasis ON/OFF output | L |
| 21 | N. C. | | | | 54 | SCK | | Communication clock of the main microcomputer | |
| 22 | N. C. | | | | | | | | |
| 23 | N. C. | | | | 55 | BUSO | | Communication output of the microcompujter | |
| 24 | N. C. | | | | | | | | |
| 25 | N. C. | | | | 56 | BUSI | I | Communication input of the microcomputer | |
| 26 | N. C. | | | | | | | | |
| 27 | N. C. | | | | 57 | —— | | Connect to GND | |
| 28 | N. C. | | | | 58 | ICPWR | | Check input of IC power supply | H |
| 29 | N. C. | | | | 59 | —— | | Connect to GND | |
| 30 | N. C. | | | | 60 | N. C. | O | | |
| 31 | N. C. | — | | | 61 | N. C. | | | |
| 32 | VDD | | +5V power supply | — | 62 | N. C. | | | |
| 33 | DIRC | O | Inversion output of direction for track jump. | | 63 | N. C. | | | |
| | | | | | 64 | VSS | — | GND for power supply | |

Table 9-18 Pin functions of PD4210A

# 10. FOR HEI AND HB TYPES

NOTES :
- Parts without part number cannot be supplied.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5 %, and K = 10 %).
560 Ω → 56 × $10^1$ → 561 ..... RD1/4PS 5 6 1 J
47k Ω → 47 × $10^3$ → 473 ..... RD1/4PS 4 7 3 J
0.5 Ω → 0R5 ..... RN2H 0 R 5 K
1 Ω → 010 ..... RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).
5.62k Ω → 562 × $10^1$ → 5621 ..... RN1/4SR 5 6 2 1 F

## 10.1 CONTRAST OF MISCELLANEOUS PARTS

**The FD-J7/HEI and HB types are the same as the FD-J7/KU type with the exception of the following sections.**

| Mark | Symbol & Description | Part No. | | | Remarks |
|---|---|---|---|---|---|
| | | KU type | HEI type | HB type | |
| | TUNR unit | RWE1011 | RWE1010 | RWE1010 | |
| | MAIN unit | RWZ1894 | RWZ1889 | RWZ1884 | |
| | PWTB unit | RWZ1895 | RWZ1890 | RWZ1885 | |
| | PWSB unit | RWZ1896 | RWZ1891 | RWZ1886 | |
| | KEYL unit | RWZ1897 | RWZ1892 | RWZ1887 | |
| | KEYR unit | RWZ1898 | RWZ1893 | RWZ1888 | |
| | FM antenna | ADH1005 | • • • • • | • • • • • | |
| | FM antenna assembly | • • • • • | ADH1002 | ADH1002 | |
| ⚠ | 1P AC outlet | AKP-507 | AKP-508 | AKP-509 | |
| ⚠ | Strain relief | CM-22C | CM-22B | CM-22B | |
| ⚠ | AC power cord | PDG1002 | PDG1003 | PDG1004 | |
| ⚠ | FU401,FU402 Fuse (800mA) | REK-079 | • • • • • | • • • • • | |
| ⚠ | FU401,FU402 Fuse (T500mA) | • • • • • | REK-097 | REK-097 | |
| ⚠ | FU403,FU404 Fuse (1A) | REK-080 | • • • • • | • • • • • | |
| ⚠ | FU403,FU404 Fuse (T630mA) | • • • • • | REK-098 | REK-098 | |
| ⚠ | FU301 Fuse (T2A) | • • • • • | REK-103 | REK-103 | |
| | Operating instructions (3 Language) | • • • • • | RRD1080 | • • • • • | |
| | Operating instructions (4 Language) | • • • • • | RRD1081 | • • • • • | |
| ⚠ | Power transformer (AC120V) | RTT1118 | • • • • • | • • • • • | |
| ⚠ | Power transformer (AC220V,240V) | • • • • • | RTT1119 | RTT1119 | |

### PWTB Unit

**The PWTB unit (RWZ1890 : HEI type) and (RWZ1885 : HB type) are the same as the PWTB unit (RWZ1895 : KU type) with the exception of the following sections.**

| Mark | Symbol & Description | Part No. | | | Remarks |
|---|---|---|---|---|---|
| | | RWZ1895 | RWZ1890 | RWZ1885 | |
| ⚠ | R301 | RD1/2PM225J | • • • • • | • • • • • | |
| ⚠ | C301 – C303 (0.01μ/400V AC) | VCG-044 | RCG-009 | RCG-009 | |
| ⚠ | RY301 | ASR1024 | ASR-512 | ASR1024 | |

**TUNR Unit**

**The TUNR unit (RWE1010 : HEI and HB types) is the same as the TUNR unit (RWE1011 : KU type) with the exception of the following sections.**

| Mark | Symbol & Description | Part No. | | Remarks |
|---|---|---|---|---|
| | | RWE1011 | RWE1010 | |
| | C728 | • • • • • | CKPUYF223Z25 | |
| | C751,C752 | CQMA182J50 | CQMA122J50 | |
| | C762 | • • • • • | CKPUYB681K50 | |
| | C763 | • • • • • | CEAS2R2M50 | |
| | C772,C773 | CQMA562J50 | CQMA392J50 | |
| | D701,D702,D710,D713 | • • • • • | 1SS254 | |
| | D711,D712 | • • • • • | 1SS85 | |
| | F704 Unti-bardy filter | • • • • • | ATF-146 | |
| | Q702,Q703 | • • • • • | DTC124ES | |
| | Q705 | • • • • • | DTA143ES | |
| | Q710 | • • • • • | 2SC1740S | |
| | R716,R720,R776 | • • • • • | RD1/6PM681J | |
| | R722 | RD1/6PM153J | RD1/6PM273J | |
| | R748 | • • • • • | RD1/6PM224J | |
| | R749 | • • • • • | RD1/6PM473J | |
| | R750,R752 | • • • • • | RD1/6PM472J | |
| | R751 | • • • • • | RD1/6PM222J | |
| | R774 | • • • • • | RD1/6PM102J | |
| | R775 | • • • • • | RD1/6PM104J | |
| | R777 | • • • • • | RD1/6PM103J | |
| | TC701 Ceramic trimmer | • • • • • | ACM-018 | |
| | 4P antenna terminal | AKA1009 | • • • • • | |
| | 2P antenna terminal with PAL | • • • • • | AKA1015 | |
| | FM front end | RWB1002 | AXF1031 | |
| | AM RF tuning block | AXX1011 | • • • • • | |
| | AM RF tuning block | • • • • • | AXX1012 | |
| | AM RF tuning block | • • • • • | AXX1013 | |

**PWSB Unit, KEYL Unit and KEYR Unit**

**These units are the same as the KU type except part No. of the Unit.**

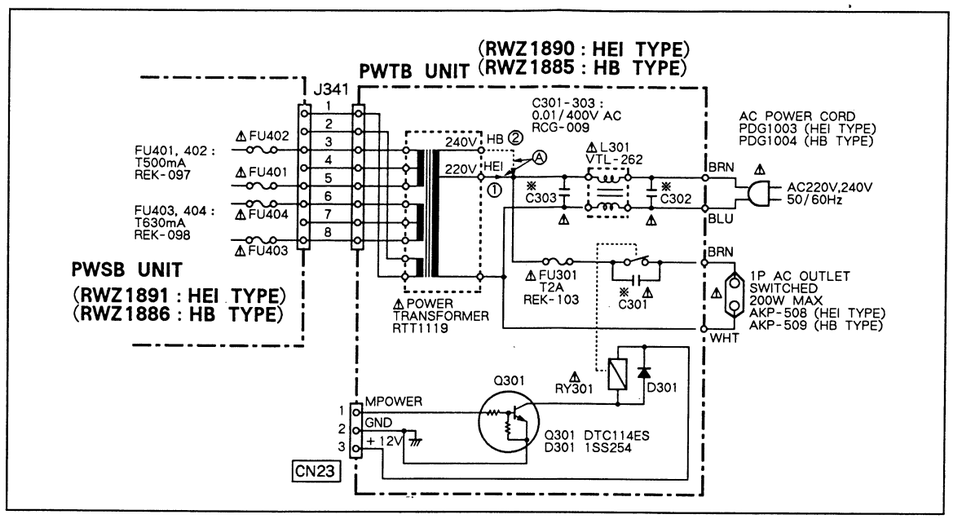
**MAIN Unit**

- **The difference in parts between the MAIN units KU type and HEI, HB types is only the jumper wire. As to the schematic diagram and P. C. Boards connection diagram, refer to P21 and P28.**
- **The difference between HEI type and HB type is only a part No. of the Unit.**

## 10.2 SCHEMATIC DIAGRAM AND P.C.BOARDS PATTERN

Note : The HEI and HB types are the same as the KU type except the power supply section and the TUNR unit. For the other units, refer to the section "5. Schematic diagrams" and "6. P.C.Boards connection diagram".

### 1. Power Supply Section




**LINE VOLTAGE SELECTION**

Line voltage can be changed with the following steps.

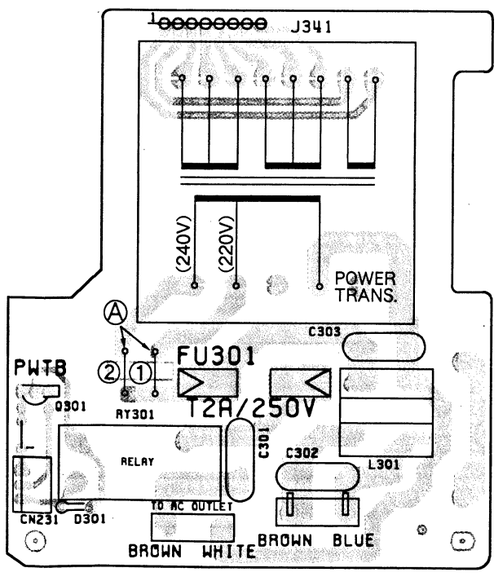
1. Disconnect the AC power cord.
2. Remove the top cover.
3. Change the position of the jumper Ⓐ as follows.

| Voltage | Jumper Ⓐ position |
|---|---|
| 220V | ① |
| 240V | ② |

4. Stick the line voltage label on the rear panel.

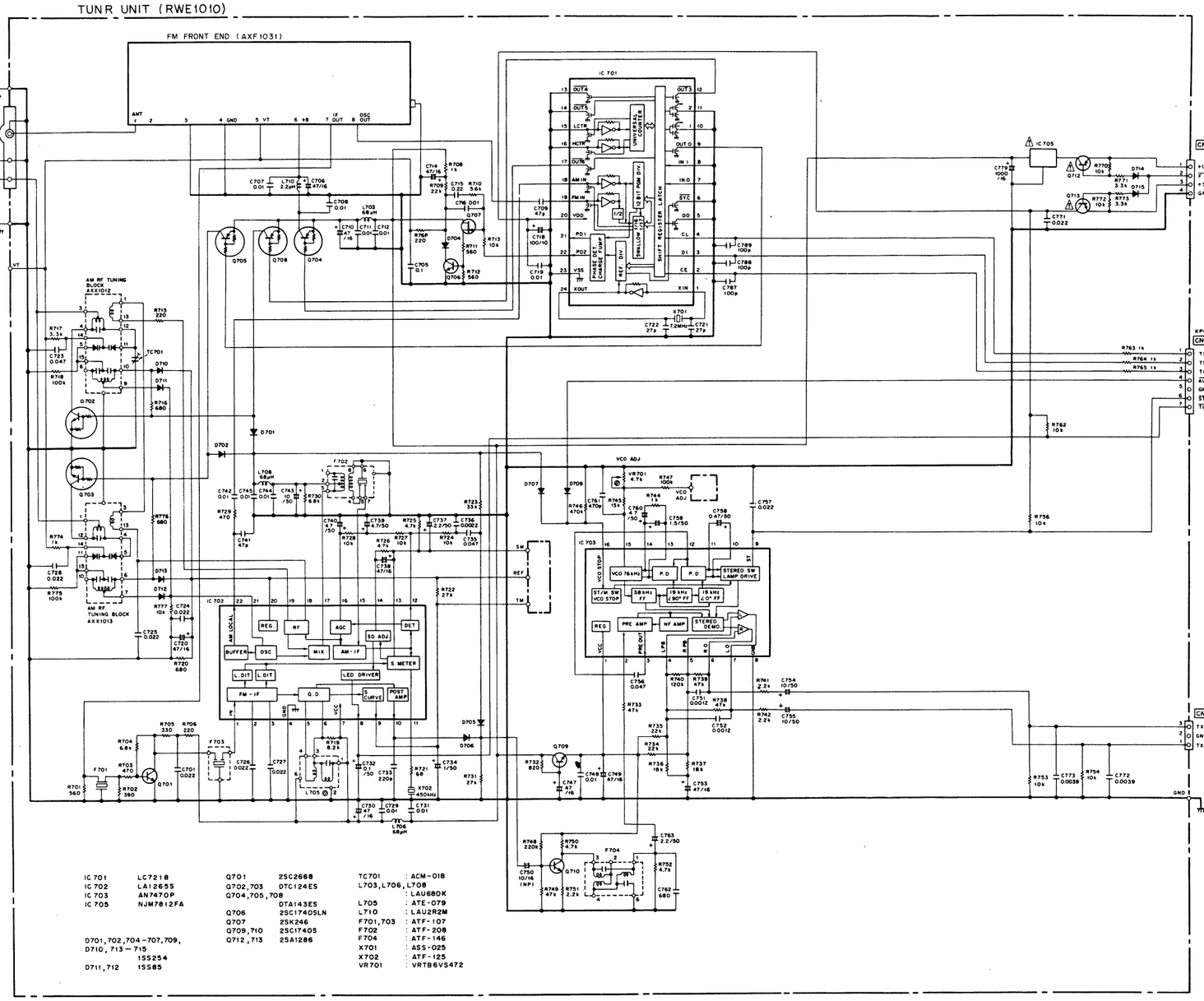
| Part No. | Description |
|---|---|
| AAX-193 | 220V label |
| AAX-192 | 240V label |

(RWZ1890 : HEI TYPE)
PWTB UNIT (RWZ1885 : HB TYPE)

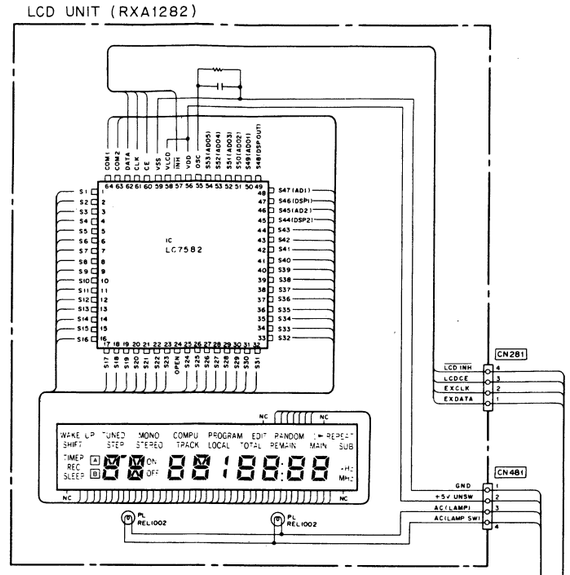


## 2. TUNR, LCD, KEYL AND KEYR UNITS

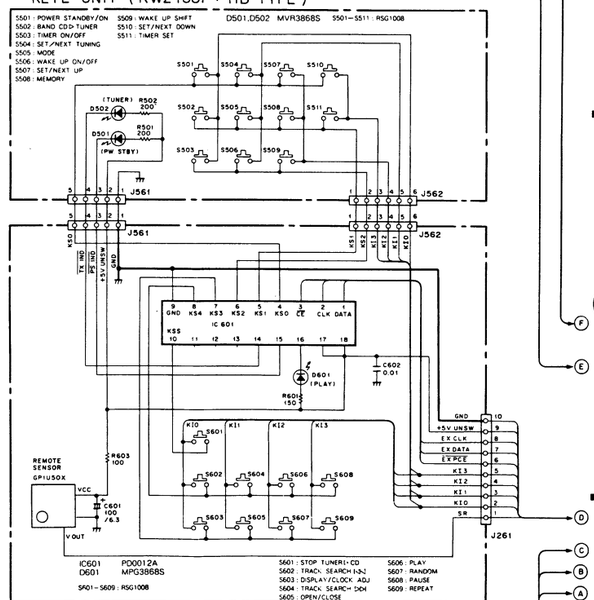
TUNR UNIT (RWE1010)




LCD UNIT (RXA1282)




(RWZ1892 : HEI TYPE)
KEYL UNIT (RWZ1887 : HB TYPE)




KEYR UNIT (RWZ1893 : HEI TYPE)
(RWZ1888 : HB TYPE)

FM front end (AXF1031) (Unit : V)

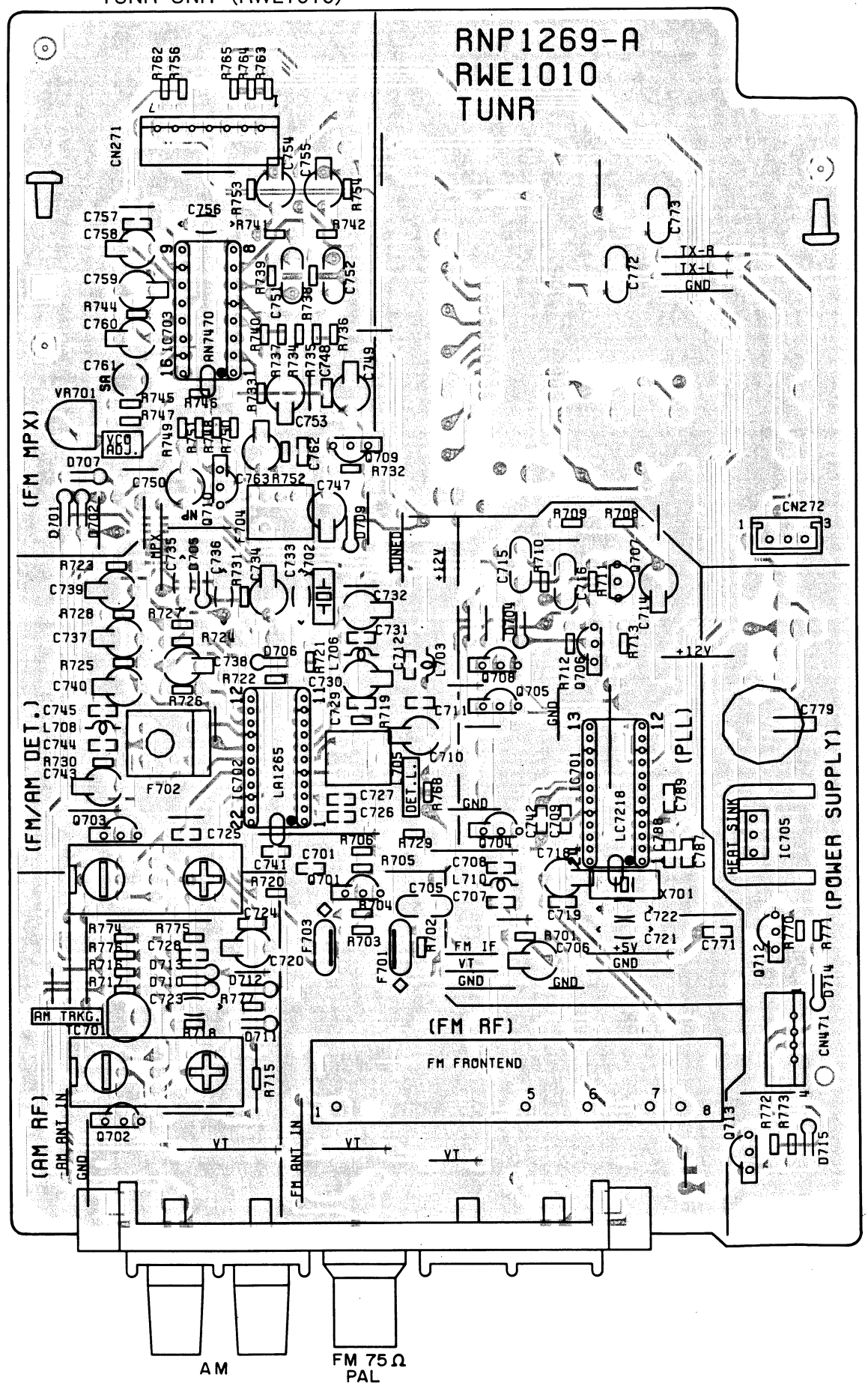
| Pin No. | FUNCTION SELECT | | | |
|---|---|---|---|---|
| | CD | TUNER | | |
| | | MW | LW | FM |
| 1 | 0 | 0 | 0 | 0.1 |
| ∗1) 5 | 0 | 1.4 – 7.2 | 3.0 – 4.5 | 2.5 – 9.9 |
| 6 | 0 | 0 | 0 | 11.8 |
| 7 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 |

IC702 (LA1265S) (Unit : V)

| Pin No. | FUNCTION SELECT | | | |
|---|---|---|---|---|
| | CD | TUNER | | |
| | | MW | LW | FM |
| 18 | 0 | 2 | 2 | 0 |
| 19 | 0 | 2 | 2 | 0 |
| 20 | 0 | 4 | 4 | 3.5 |
| 21 | 0 | 4 | 4 | 2 |

∗1) Voltage changes by the BAND reception frequency because of this is the tuning voltage.

TUNR UNIT (RWE1010)



TUNR UNIT (RWE1010)




This P. C. B. connection diagram is viewed from the foil side.

# 11. SPECIFICATIONS

## ■ Compact disc player

Type . . . . . Compact disc digital audio system
Pick-up . . . . . 3-beam semiconductor laser type
D/A conversion . . . . . 16-bit linear
Frequency response . . . . . 4 Hz to 20 kHz ±0.5 dB (EIAJ)
SN ratio . . . . . 104 dB or more (EIAJ)
Dynamic range . . . . . 97 dB or more (EIAJ)
Channel separation . . . . . 98 dB or more (EIAJ)
Wow and flutter . . . . . Limit of measurement (±0.001 %, W.PEAK) or less (EIAJ)
Total harmonic distortion . . . . . 0.0035 % or less (EIAJ)
Output voltage . . . . . 1.9 V ±0.2 V
Number of channels . . . . . 2 channels (stereo)

## ■ FM tuner

Frequency range
U.S. model . . . . . 87.5 MHz ~ 108.0 MHz
U.K. and European models . . . . . 87.50 MHz ~ 108.00 MHz
Usable sensitivity . . . . . 12.5 dBf, IHF (1.1μV/75Ω)
Sensitivity . . . . . Mono S/N 50 dB: 19.2 dBf (2.5μV/75Ω)
Sensitivity (DIN) Mono . . . . . 1.0μV/75Ω
Stereo (Muting off) . . . . . 28μV/75Ω
SN ratio: Mono . . . . . 78 dB
Stereo . . . . . 74 dB
SN ratio (DIN): Mono . . . . . 69 dB
Stereo . . . . . 64 dB
Distortion: Stereo . . . . . 0.4 % (1 kHz)
Separation . . . . . 45 dB (1 kHz)
Frequency response . . . . . 30 Hz to 15 kHz ±1 dB
Output level . . . . . 880 mV (1 kHz, 100 % modulation)
Antenna . . . . . 75 Ω unbalanced type

## ■ AM tuner

Frequency range
U.S. model . . . . . 530 kHz ~ 1,700 kHz
U.K. and European models . . . . 531 kHz ~ 1,602 kHz (MW)
153 kHz ~ 281 kHz (LW)
Sensitivity (IHF, Loop antenna) . . . . . 350μV/m (MW)
1500μV/m (LW)
SN ratio . . . . . 50 dB (400 Hz) (MW)
Output level . . . . . 180 mV (400 Hz, 30 % modulation)
Antenna . . . . . Loop antenna (supplied)

## ■ Miscellaneous

Power Requirements
U.S. model . . . . . AC 120 V, 60 Hz
U.K. model . . . . . AC 240 V~, 50/60 Hz
European model . . . . . AC 220 V~, 50/60 Hz
Power consumption
U.S. model . . . . . 14 W
U.K. and European models . . . . . 12 W
Operating temperature . . . . . +5°C to +35°C (+41°F to +95°F)
Dimensions . . . . . 360 (W) × 90 (H) × 332 (D) mm 14-3/16 (W) × 3-9/16 (H) × 13-1/16 (D) in
Weight (without package) . . . . . 4.5 kg (9 lb 15 oz)

## ■ Accessories

FM T-type antenna . . . . . 1
AM loop antenna . . . . . 1
Designated control cord . . . . . 1
Audio cord . . . . . 1
Remote control unit . . . . . 1
Size "AAA" battery (IEC R03/UM-4) . . . . . 2
Operating Instructions
U.S. and U.K. models . . . . . 1
European model . . . . . 3

## ■ Functions

**CD player**

- TRACK SEARCH, MANUAL SEARCH
- 24-track programmed playback, reserved program
- PAUSE program
- AUTO PROGRAM EDIT
- COMPU PROGRAM EDIT
- PROGRAM REPEAT
- TRACK REPEAT
- ALL REPEAT
- RANDOM PLAY
- RANDOM REPEAT

**Tuner**

- FM/AM random 24-station preset
- FM/AM (MW) AUTO TUNING

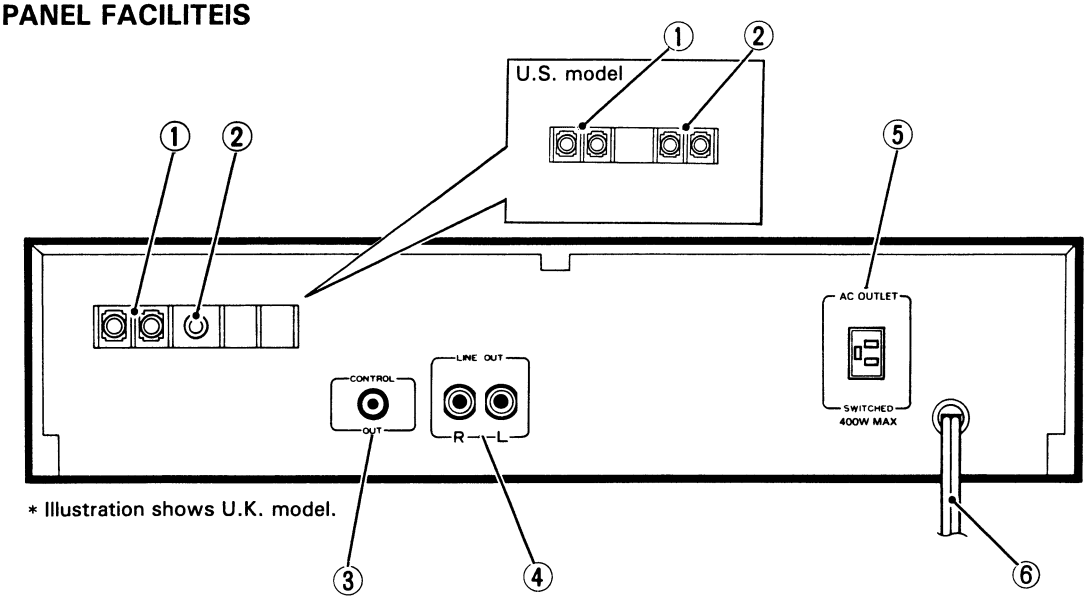
**Timer**

- SLEEP TIMER
- TIMER playback, TIMER recording
- WAKE UP TIMER (with SHIFT function)

- *Specifications and design subject to change without prior notice.*

# 12. PANEL FACILITIES

## REAR PANEL FACILITEIS




* Illustration shows U.K. model.

### ① AM antenna terminals

Connect the supplied loop antenna and an external antenna.

### ② FM antenna terminals

Connect the supplied FM T-type antenna or an external antenna.

### ③ CONTROL OUT jack

An output jack for system control signals.
Connect to the CONTROL jack of the amplifier when combining with the optional stereo amplifier A-J7 and the stereo double deck T-J7.

### ④ LINE OUT jacks

Connect to the input jack for CD/TUNER (or CD, TUNER, AUX) of the stereo amplifier.

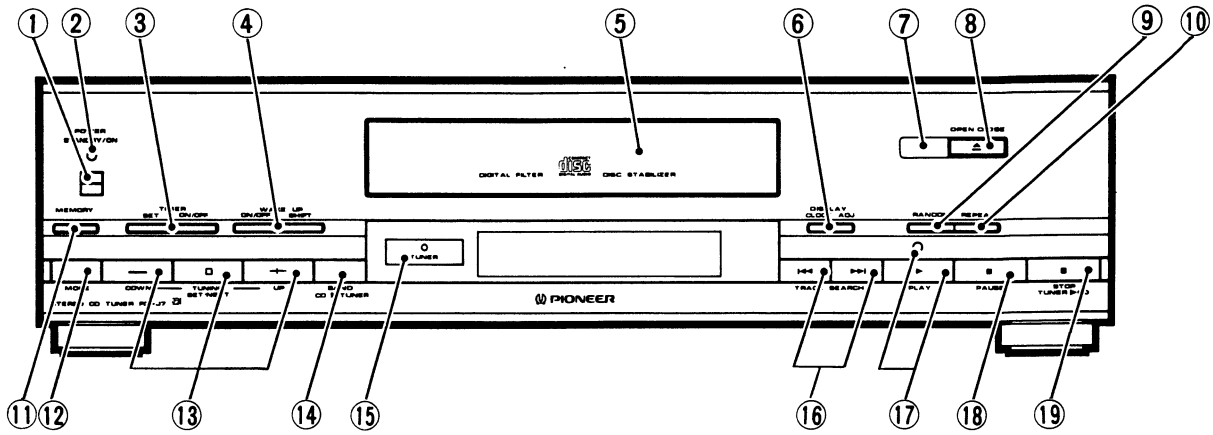
### ⑤ AC OUTLET

**[U.S. model]**
**SWITCHED 300 W MAX**
Power supplied through this outlet is turned on and off by this equipment's POWER switch. Total electrical power consumption of connected equipment should not exceed 300 W.
**[U.K. and European models]**
**SWITCHED 400 W MAX**
Power supplied through this outlet is turned on and off by this equipment's POWER switch. Total electrical power consumption of connected equipment should not exceed 400 W.

*NOTE:*
*Do not connect appliances with high power consumption such as heaters, irons, or television sets to the AC OUTLET, in order to avoid overheating or fire risk.*
*This can cause this equipment to malfunction.*

### ⑥ POWER CORD

## FRONT PANEL FACILITEIS




### ① POWER STANDBY/ON switch

This is the power supply switch.

**ON:** When set to the ON position, power is supplied and the unit becomes operational.

**STANDBY:** When set to the STANDBY position, the main power flow is cut and the unit is no longer fully operational. A minute flow of power feeds the unit to maintain operational readiness.

### ② STANDBY indicator

Lights up when the power of the unit is switched STANDBY, and goes off when the power is switched ON.

### ③ TIMER switches

**SET:** To set the timer.

**ON/OFF:** Determines whether to activate the timer as set.

### ④ WAKE UP switches

**ON/OFF:** Determines whether to activate the WAKE UP timer.

**SHIFT:** To change the time of the WAKE UP timer for one time only. Useful function when you want to wake up earlier than usual.

### ⑤ Disc tray

For setting the compact disc.

### ⑥ DISPLAY / CLOCK ADJ switch

To switch the display of the indicators during playback of a CD.
In the tuner mode, the display is switched from clock to frequency and vice versa.
This switch is also used to adjust the time (CLOCK ADJ).

### ⑦ Remote sensor

### ⑧ OPEN/CLOSE switch ( ⏏ )

The disc tray will eject and withdraw every time this switch is pressed when the power is ON.

### ⑨ RANDOM switch

Press this switch to start CD random playback (playback where the CD player selects the order of songs).

### ⑩ REPEAT switch

Press this switch to play a CD repeatedly.
The repeat mode will change in the sequence of one track repeat, all track repeat, and cancel every time the switch is pressed.

### ⑪ MEMORY switch

To preset a broadcasting station.

### ⑫ MODE switch

Switches the receiving mode.

### ⑬ TUNING (UP, DOWN) switches

To tune in to your desired broadcasting station.
When the ⊞ (UP) switch is pressed while the ⊡ switch is being depressed, the frequency will increase; when the ⊟ (DOWN) switch is pressed while the ⊡ switch is being depressed, the frequency will decrease.

⊡ switch is used for the procedure setting (SET/NEXT) when setting time or the timer.

### ⑭ BAND switch

To switch FM to AM (MW/LW: U.K. and European models) and vise versa.
This switch is also used for switching from CD playback to tuner mode (CD ▶ TUNER).

### ⑮ TUNER indicator

Lights up in the tuner mode.

### ⑯ TRACK SEARCH switches (|◄◄, ►►|)

To search your desired track during playback (or programmed playback) or pause. When the switch is pressed, playback starts at the next track or goes back to the previous track.
When the switch is pressed in the stop mode, the track numbers will be displayed in sequence with their respective playback time (max. 29 tracks).

►►|: When the switch is pressed once, playback will start at the beginning of the next track. When it is held down, playback will start at the beginning of the track following the one which is presently played back.

|◄◄: When the switch is pressed once, playback will resume at the beginning of the track being played. When it is held down, playback will resume at the beginning of the previous track.

### ⑰ PLAY switch (►)/indicator

To start playing a CD or cancel pause mode. The indicator lights up during playback.
When the switch is pressed in the tuner mode, it will switch to CD playback mode.

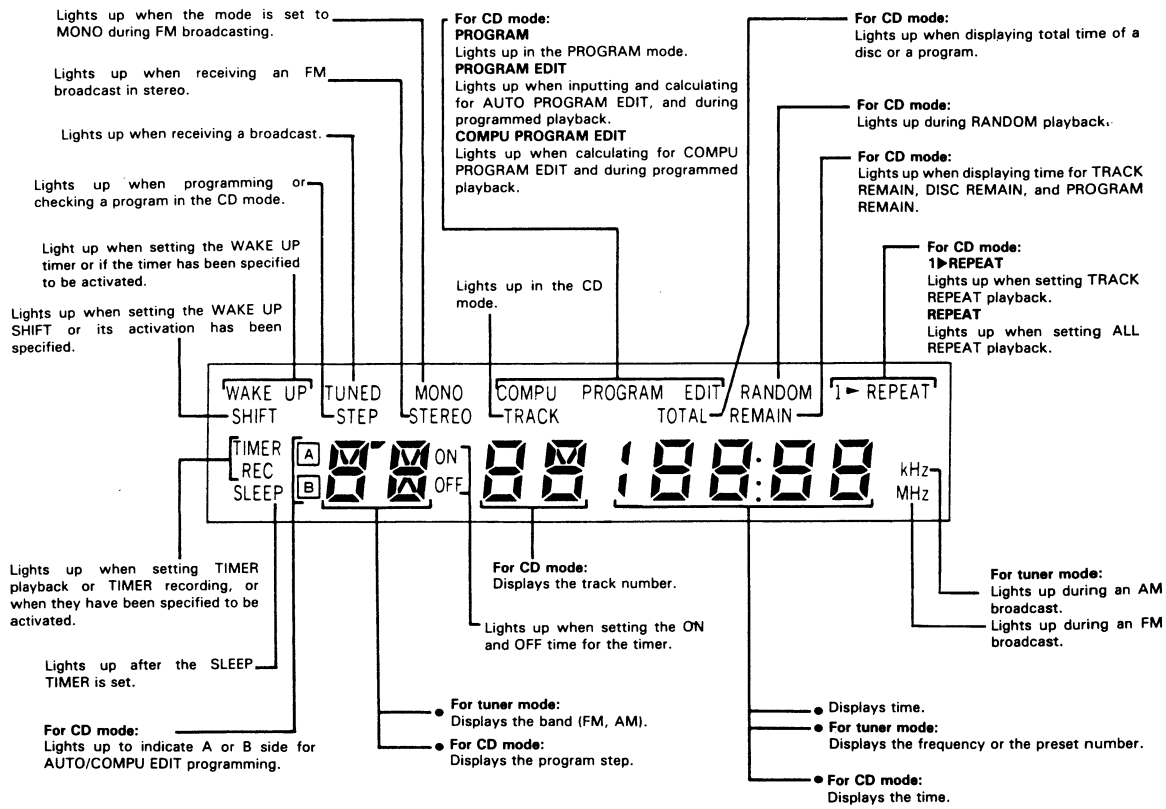
### ⑱ PAUSE switch (▮▮)

Press this switch to temporarily interupt CD playback.
When the switch is pressed again, pause mode will be canceled and playback is resumed.

### ⑲ STOP switch (■)

To end CD playback.
If the switch is pressed when the playback is stopped in the program mode, all programs will be cleared.
This switch is also used for switching from tuner to CD playback mode (TUNER►CD).

## INDICATORS


Lights up when the mode is set to MONO during FM broadcasting.
Lights up when receiving an FM broadcast in stereo.
Lights up when receiving a broadcast.
Lights up when programming or checking a program in the CD mode.
Light up when setting the WAKE UP timer or if the timer has been specified to be activated.
Lights up when setting the WAKE UP SHIFT or its activation has been specified.
For CD mode:
PROGRAM
Lights up in the PROGRAM mode.
PROGRAM EDIT
Lights up when inputting and calculating for AUTO PROGRAM EDIT, and during programmed playback.
COMPU PROGRAM EDIT
Lights up when calculating for COMPU PROGRAM EDIT and during programmed playback.
Lights up in the CD mode.
For CD mode:
Lights up when displaying total time of a disc or a program.
For CD mode:
Lights up during RANDOM playback.
For CD mode:
Lights up when displaying time for TRACK REMAIN, DISC REMAIN, and PROGRAM REMAIN.
For CD mode:
1►REPEAT
Lights up when setting TRACK REPEAT playback.
REPEAT
Lights up when setting ALL REPEAT playback.
WAKE UP
SHIFT
TUNED
STEP
MONO
STEREO
COMPU
TRACK
PROGRAM
EDIT
TOTAL
RANDOM
REMAIN
1► REPEAT
TIMER
REC
SLEEP
A
B
ON
OFF
kHz
MHz
Lights up when setting TIMER playback or TIMER recording, or when they have been specified to be activated.
Lights up after the SLEEP TIMER is set.
For CD mode:
Lights up to indicate A or B side for AUTO/COMPU EDIT programming.
For CD mode:
Displays the track number.
Lights up when setting the ON and OFF time for the timer.
For tuner mode:
Displays the band (FM, AM).
For CD mode:
Displays the program step.
Displays time.
For tuner mode:
Displays the frequency or the preset number.
For CD mode:
Displays the time.
For tuner mode:
Lights up during an AM broadcast.
Lights up during an FM broadcast.

The indicators will change as follows every time DISPLAY switch is pressed:

- **In the tuner mode:**
  Frequency ↔ Clock
- **In the CD mode:**
  ┌→ Time → TRACK REMAIN → ALL REMAIN → TOTAL┐